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# DESCRIPTIONS AND FIGURES

OF

# TWO HUNDRED FISHES;

COLLECTED AT

VIZAGAPATAM ON THE COAST OF COROMANDEL,

BY

188978

PATRICK RUSSELL, M.D. F.R.S.

PRESENTED TO

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# PREFACE.

THE following Collection of Fishes, the fruit of many laborious hours, when disengaged from other pursuits of natural history, was completed in the course of several years residence at Vizagapatam, on the coast of Coromandel.

Some time after my return from that country, the Drawings were presented to the East India Company; and to the Honourable the Court of Directors, at all times disposed to promote the cultivation of natural history in the British establishments in the East, the present Work owes its appearance.

An idea of profiting of a maritime situation so favourable to ichthyological pursuits was first excited by the view of fishermen daily dragging the large seine, or angling from boats and catamarans beyond the surf: but my library, besides Belon, Willoughby, Ray, and Linneus, was scantily provided with books on a subject which had before only cursorily interested me; and I should have desisted despondently, had not the Right Hon. Sir Joseph Banks, who honoured me with his correspondence, suggested how defective the history of Indian Fishes was in Europe at that time, and encouraged me to proceed.

A native painter whom I retained in my employment, had made progressive improvement in this new line. Endued by nature with a quick eye, patient and docile, he learned in a short time to delineate so accurately the parts pointed out to him, that his figures, howsoever deficient in art and grace, may in general be relied on in respect to fidelity in representation.

It was my original intention to have had the Drawings, in like manner as the Coromandel Serpents, coloured from nature: but after many fruitless

attempts, I was obliged to relinquish my design. In a hot climate, the colours of fish are more rapidly fugitive after death than in serpents. They escape while the painter is adjusting his palette; and in the fine gradations from the most brilliant to the softer evanescent tints, nature, through boundless variety, ever maintains a certain harmony and characteristic simplicity in her transitions, that required a delicate pencil under more masterly guidance than my artist had pretensions to.

I the rather mention this circumstance for its having led to an exuberance in description which might have otherwise been spared. Yet over minute as I thought I had been in point of colour, it was found upon trial by more than one artist in London, that insuperable obstacles arose to colouring the Drawings from my descriptions.

From a graduated scale of colours marked by figures, the tints selected by myself were marked by correspondent figures on the Drawings, and the written description laid before the painter at the same time. In the returned Drawings the predominant colours were found tolerably exact; but numerous interstices remained blank, which neither the description nor my recollection could supply: if filled up at all, it must have been merely by conjecture.

I am inclined therefore to think that drawings of fish can only be properly coloured from recent subjects; and that in proportion as fancy and conjecture are admitted, or recollection at any distance of time relied on, coloured drawings descend below verbal descriptions.

Language affords definite terms for the prime colours, and many of their shades: and by leaving those interstitial gradations blank which the pencil only can express adequately, the eye is less liable to be misled than when attracted by glaring colours, obtruded sometimes contrary to truth, and often at variance with the harmonious simplicity of nature. The force of this remark will be felt more sensibly on a comparison of some of the plain engravings in Valentine's History of Amboina,* with the illuminated figures of the same fishes in Renard.†

* Francis Valentine, a Dutch clergyman at Amboina, Banda, &c. in his history of those countries, published in Dutch, in 1726, has given engraved figures, together with short descriptions, of about four hundred and sixty fishes. But in both, the essential characters have been so little attended to, and the caprice of the painter exercised with such uncontrolled licence, that little beyond conjectural information can be derived from most of them.

From what has been said no more is meant to be inferred, than that coloured drawings, in regard to most Indian fishes, can be accurately executed in India only; that such as have been done in Europe from wet or dry specimens are often faulty; and that some figures in Bloch's justly celebrated work, cannot, in point of colour, claim exemption. It may be proper to add, that notwithstanding my own failure, I entertain no doubt of the success of Indian artists under better instruction than I was capable of giving.

In the arrangement of the Collection, there is little deviation from the Linnean classification. Of the genera newly instituted, one only from Bloch has been adopted.

That the large additions made lately to the catalogue of Indian fishes unknown to Artedi and Linneus require new invented genera, can admit of little doubt. Many have been formed by Bloch in his late History of Fishes; and a much more considerable number by La Cepede in his Continuation of Buffon's Natural History

Of the merit of these late innovations, unknown to me in India, I do not presume to judge. The present collection affording but few instances to sanction innovation, I deemed it better to adhere to the classification long familiar to me; and when in doubt to what genus the subject belonged, to place it nearest the one to which it seemingly bore most affinity: leaving it with more experienced naturalists to transfer each to its proper station.

† Another collection, but of coloured figures, painted by order of M. Balthazar Coyett, when governor of the Molucca Islands, was published at Amsterdam in 1754, and dedicated to his Britannic Majesty. The number of fishes in two volumes amount to above four hundred, and most of them agree in shape with the figures in Valentine: in colour there is frequent variation, which the Editor in his Preface unsuccessfully attempts to account for. In respect to the second volume, the Editor owns that the painter had taken most unjustifiable liberty in colouring; a concession that might safely have been extended to the first.

Eight years before Valentine's history, a collection professing to be of unknown Indian fishes, had been published at Amsterdam by Hen. Ruysch. It contains about four hundred figures, the greater part of which are found in Valentine; they are smaller in size, but equally rude and extravagant.

The style of drawing in the three above-mentioned collections sufficiently denotes the hand of Indian artists. But a resemblance so striking in figures, sketched by different hands at distant periods, must either suppose existing originals from which they drew, or admit a coincidence in the sporting of pure fancy more improbable than the utmost extravagance of the figures represented. To this may be added, that the original of several figures long held as fictitious have lately been well described; justifying an opinion hazarded by the eminent naturalist Pallas, that the originals of all will in time be discovered.

In the genera Sparus, Labrus, Perca, and Sciæna, which Linneus left as requiring reformation, and which have confessedly puzzled Forskal as well as other travellers, I flatter myself with an allowance being made for me, which, with more diffidence, I wish to be extended to other instances of error. — For the additions under much doubt made to the genus Zeus, a kind of reason, such as it is, has been offered in another place.

I am fully sensible, that the vulgar names affixed to each species, though collected with care, must be liable to error. It is almost inevitable where the collector himself ignorant in the language, must trust to the ear in seizing the pronunciation of words to which he is incapable of affixing a meaning.

Lists of local names written in the country dialects were procured from Ganjam and Ingeram, which differed from each other, while both in most instances differed from the current names at Vizagapatam. The number of fishes in the respective lists, said to comprehend the whole known at each place, amounted in the first to between seventy and eighty, and in the second to near one hundred: but there can be little doubt that many species, not used by the natives as food, were not inserted.

The fishes caught at Vizagapatam, or in the vicinage, are most of them probably common to other places on the coast. Having occasion to make a short visit to Madras, I took the opportunity of showing my Drawings to some of the principal fishermen assembled on purpose, who readily recognized and named them; a few excepted. Soon after, on a fishing party at St. Toma, in the vicinity of Madras, where several large nets were dragged, I found some species of Scomber and of Clupea quite new to me; but most of the other Fishes were the same as at Vizagapatam. In Bloch's General History also are several Coromandel Fishes which I had not before met with. The present collection may therefore be said to contain a large portion, though not the whole, of the fishes found on that coast.

Of the Indian fishes delineated by Bloch, he acknowledges himself indebted for many to the Rev. Mr. John at Tranquebar: and it is with pleasure I take this public opportunity of expressing my own obligations to the same respectable Missionary, for Specimens and Drawings of Serpents received formerly, as well as within these few months.

The Drawings of this Collection, as before mentioned, were executed by a native of India; and, by the advice of artists at home, have undergone only a few slight corrections. Of the Engravings some are by Heath, others by Neele, and two or three by Skelton: but the greater part by Reeve, a young diligent artist, who in the course of this Work has made progressive improvement. The initials of the artists are engraved on the respective plates.

*Weymouth Street,*
*Dec.* 10, 1802.

## ERRATA IN VOL. I.

| | | | | |
|---|---|---|---|---|
| Page 14. | No. 21. | prelongus, | *read* | prælongus. |
| —— 26. | —— 29. | last, | —— | tail. |
| —— 28. | —— 39. | unita, | —— | unitæ. |
| —— 31. | —— 42. | falcata, | —— | falcatæ. |
| —— 46. | —— 58. | filiformis, | —— | filiformibus. |
| —— 55. | —— 70. | Oblonga ovato | —— | Oblongo-ovato. |
| —— 70. | —— 88. | narrow edging | —— | narrow *yellow* edging. |

No figures accompany the descriptions of the following numbers in this volume:

No.
XVII.
XXXIII.
XXXIV.
XXXVI.
LV.

TEMEREE.

ASIATIC SOCIETY

R

# INDIAN FISHES.

## AMPHIBIA NANTES.

### RAJA.

GENERIC CHARACTER.

| | |
|---|---|
| *Spiracula* v. *subtus ad collum. Corpus depressum; os sub capite.* | Five spiracles on each side, on the under part of the neck; the body flat; the mouth underneath. |

### No. I.

RAJA *ocellata, corpore glabro; oculis minimis, foraminibus pone oculos lunatis; dorso dipterygio; cauda brevi pinnata.*

The ocellated RAY, with a smooth body; very small eyes, the apertures behind them lunated; two fins on the back; a short pinnated tail.

Called by the Natives TEMEREE.

THE form of this fish is that of a flattened orb; to which the expanded pectoral, or lateral fins, form a broad appendage. The flat head is hardly to be distinguished from the body. The small oval eyes, with the lunated aperture behind them, are about two inches and a half behind the edge of the rounded rostrum. Beneath, or on the other side, (as in all this genus,) are placed the mouth and nostrils; the former, about two inches from the rostrum, transverse, and furnished with numerous granular teeth; the latter large, open, and advanced half an inch before the mouth. On each side, behind the mouth, are five branchial spiracula.

The sides extending circularly, form the pectoral, or lateral fins. The ventral fins on each side of the anus, with the broad tail, which is at its rise, give the appearance of an apron-like appendage to the body. The two fins on the ridge of the tail, (or dorsal fins,) are oblong, and obtuse. The tail, from the first dorsal fin, is short, broad, compressed, but diminishes and grows rounder, as it approaches to the caudal fin, which is broad, oblique, blunt, and on the lower edge slightly fringed.

The *colour* of the upper part, a dusky brown, spotted with equal, round, or oval, black spots; the under part of the body white.

The *length*, from the rostrum to the beginning of the tail, ten inches; the tail, to the tip of the fin, nine inches.

TEMEREE.

R

## No. II.

RAJA *ocellata, corpore rotundo-ovato, lævi; foraminibus pone oculos oblongis; dorso dipterygio, cauda inermi, pinnata.*

The ocellated RAY, with a smooth, round-ovate body; oblong apertures behind the eyes; two dorsal fins; the tail without spine, pinnated.

Called by the Natives NALLA TEMEREE.

THE *head* hardly distinguishable from the flat orbicular body, which assumes somewhat of an oval form towards the rostrum. The eyes and the apertures behind them, two inches from the point of the rostrum. The mouth, nostrils, branchial spiracula, and lateral fin, as described in the preceding fish. The ventral fins, situated as usual, at the beginning of the tail, obtusely triangular, and also fringed on the under side. There are two dorsal fins, that is, two fins on the upper side of the tail; the first, rising opposite to the end of the ventral fins, the second, half an inch lower; both are oblong and round-pointed. The tail is at first broad, a little compressed, but soon becomes narrower and rounder, terminating in a broad, oblique, round-pointed fin.

The *colour* above, white, spotted universally with round black spots: a remarkable triangular mark, an inch behind the eyes, and a smaller, at half the distance, in front. The belly white.

The *length*, from the rostrum to the tail, seven inches. The length of the tail to the point of the fin, eight inches.

## No. III.

RAJA *capite vix convexo, dorso tuberculis minutis; cauda ter quam corpus longiore, spina, non serrata, armata, subtus pinnata.*

The RAJA with a head hardly convex; very small tubercles on the back; a tail three times longer than the body, pinnated beneath, and armed with a spine not serrated.

Called by the Natives WOLGA TENKEE.

THE *body* of a rhomboidal form; the rostrum slightly pointed. The eyes large, oval, protuberant, two inches distant from the rostrum; the foramina or apertures, wide, cordate. The jaws rough like a file, and seem to possess a freedom of motion unusual in this genus.

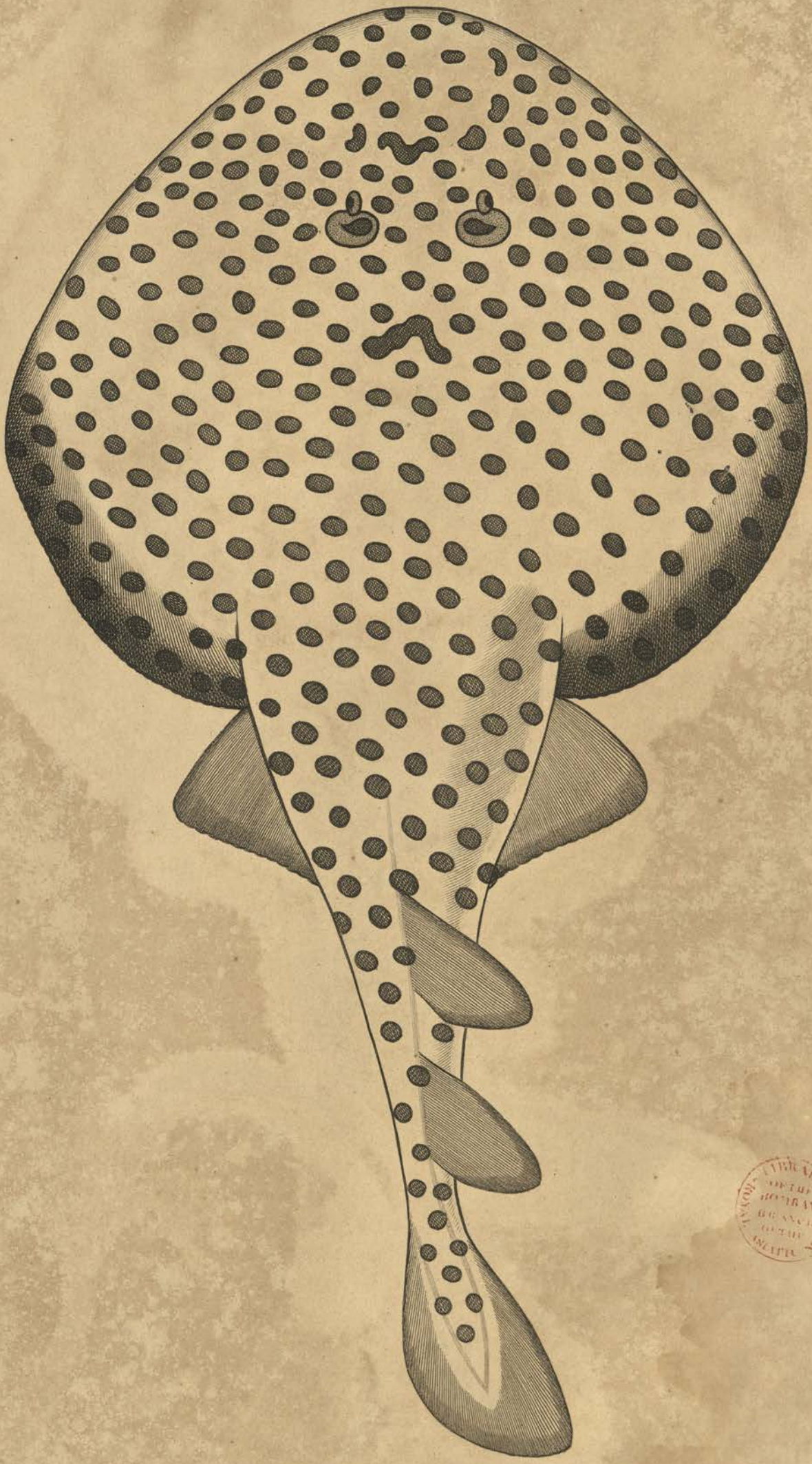
The *back* is roughened by minute, whitish tubercles, and in the middle, two whiter than the rest, exactly round, but of unequal size, are remarkable for their resemblance to fine pearls.

The ventral fins small, roundish. No dorsal fin. The tail, at the rise, flattish, thick, compressed, but gradually becomes roundish, and tapering more sensibly from the dorsal spine, is hardly thicker than a hair, at the point.

The dorsal spine two inches and a half in length, not serrated, rises at the distance of ten inches from the ventral fin, and on the opposite part, half an inch higher than the root of the spine, a fin narrow at each extremity, but broad in the middle, runs along nine inches of the lower part of the tail.

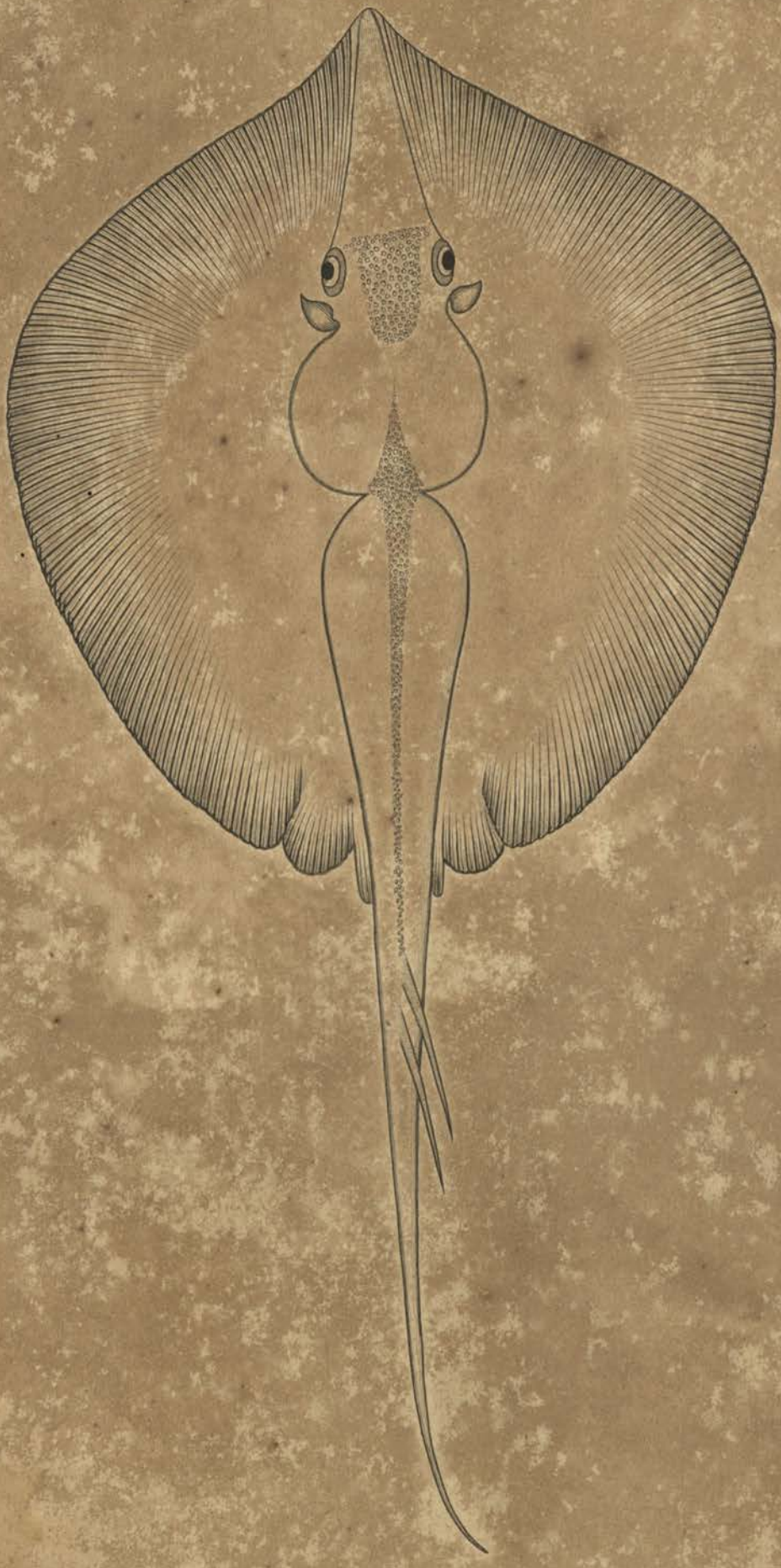
The *colour* above, of the head and body, a dull-leaden; the parts on the other side of the belly, a dusky-white. The tail a dark-blue.

The *length*, from the rostrum to the beginning of the tail, about nine inches and a half; of the tail two feet four inches.

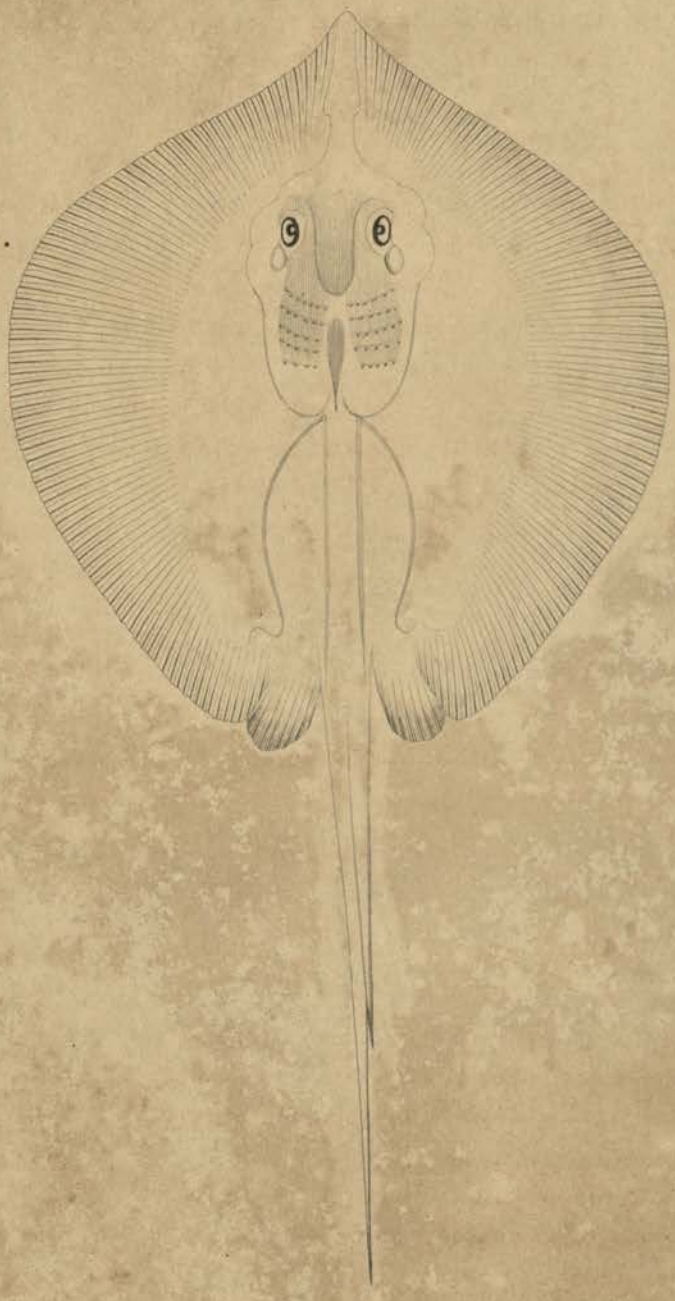


NALLA TEMEREE.

WOLGA TENKEE.



ISACURRAH TENKEE.



TENKEE SHINDRAKI.

## No. IV.

RAJA *corpore ob-ovato; rostro parum exerto, acuto; tuberculis parvis inter oculos, congerie campaniforma; spinis duabus in cauda apterygia.*

The RAJA with an ob-ovate body; the rostrum sharp, and somewhat projecting; a bell-form cluster of small tubercles between the eyes, and two spines on a finless tail.

Called by the Natives ISACURRAH TENKEE.

THE *body* broad, ob-ovate, the rostrum channelled, roughish. The eyes large, oval, protuberant, looking sidewise; the foramina pear-shaped. *Head* and back a little convex; the belly, and all below, flat. The tubercles between the eyes, are disposed in the form of a bell; others in the middle of the back, form a pyramid, from the base of which a long tapering train runs down to the first dorsal spine. The ventral fins are small and rounded; at the beginning of the tail there is a short soft appendage on each side. The two dorsal spines were an inch and a half long, but neither of them serrated.

The *colour*, in this young subject, was whitish on both sides, but whitest on the under side.

The *length*, from the rostrum to the tail, seven inches; the tail six.

## No. V.

RAJA *corpore glabro; rostro brevi, acuminato; foraminibus ovalibus pone oculos; cauda apterygia; spina dorsali lævi.*

The RAJA with a smooth body; a short, pointed rostrum; oval apertures behind the eyes; the tail without fin; the dorsal spine smooth.

Called by the Natives TENKEE SHINDRAKI.

THE *body* of the same shape with that of the fish last described. The *head* rather more convex, but the vertex depressed; the rostrum channelled. The eyes large, oval, turned towards the sides; the foramina oval, not large; behind the foramina are five transverse, curved lines, studded with minute tubercles of the same light colour with the rest of the skin, and correspondent with the branchial spiracula on the under side.

The ventral fins are small, as in the former fish, but there is no appendage at the top of the tail. The dorsal spine is proportionally long, but not serrated.

The *colour* the same with that of the preceding fish.

The *length*, from the top of the rostrum to the tail, is four inches and a half; the tail four inches.

## No. VI.

RAJA *corpore transverso-ovale, glabro; rostro brevi, parum acuminato; pinna pectorali ultra extensa; cauda breviore, fasciata, inerme, apterygia.*

The RAJA with a transverse-oval, smooth body; a short, somewhat-pointed rostrum; the pectoral fin widely extended; a very short tail, without spine and fin, and variegated black and white.

Called by the Natives TENKEE KUNSUL.

THE *head* flat, not distinguishable from the body, which is scarcely convex; the rostrum short, grooved, with a very small sharp point. The eyes small, near the rostrum; the foramina harp-form. The mouth and nostrils below, near the rostrum, and the spiracula behind, as usual.

The lateral fins extend to a blunt, fringed point, being internally (in respect to the body) lunated; the ventral fins short. The tail small, tapers to a hair-like point, and is marked with cross bands, alternately black and white, resembling the quill of a porcupine.

The *colour* of the head and back a dark-gray; the belly white.

The *length*, from the rostrum to the tail, six inches and a half. The tail four inches; the breadth, from the tip of one lateral fin, to the tip of the other, one foot.

## No. VII.

RAJA *corpore fasciis latis cæruleis, pinna dorsali ad initium caudæ; cauda longissima, gracili, inermi, apterygia.*

The RAJA with broad, cærulean cross bands, on the back; a short fin on the upper part of the tail, or back; the tail very long, slender, without spine and fin.

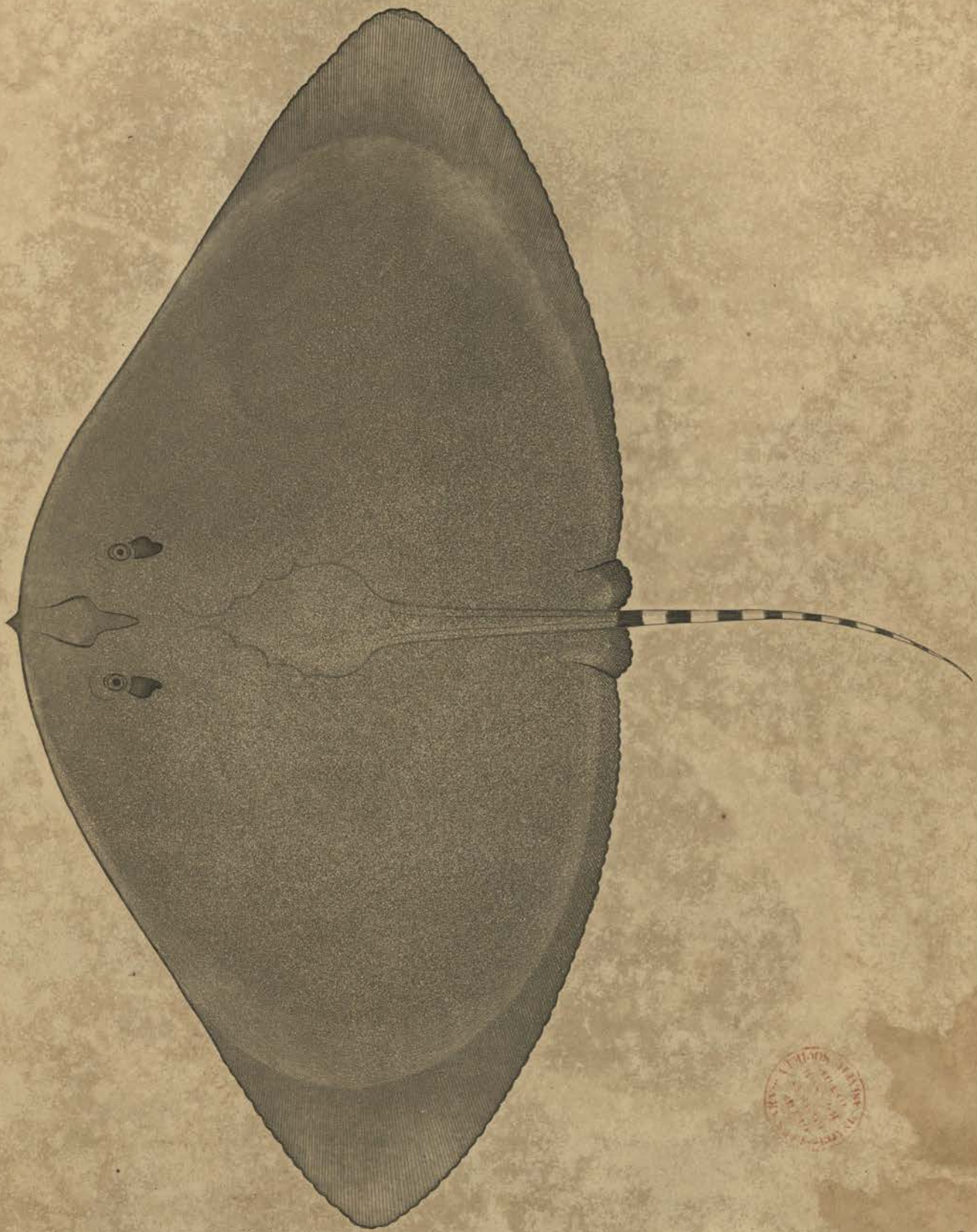
Called by the Natives MOOKARAH TENKEE.

THE *head*, which in many species of the Raja, can hardly be distinguished from the body, is here, not only considerably raised or convex, but from the eyes, projects forward beyond the body. It is depressed on the crown, and flattened on the sides; the rostrum rounded. The eyes large, oval, protuberant; the foramina behind oblong. The nostrils and mouth beneath; the mouth not large; the teeth granulous.

The lateral extended fins, slanting to a sharp point from the cheeks, and the posterior edges, being slightly falcate, give exactly the appearance of wings expanded. The ventral fins, close to the anus, are rounded. The dorsal fin, at the origin of the tail, is small, and square-form. The tail very long, without spines, and at the point as small as a hair.

The *colour* of the head and body, a dark-gray, with six broad, transverse, blue bands, of different shades: the tail is of a dark-gray, with a mixture of brown.

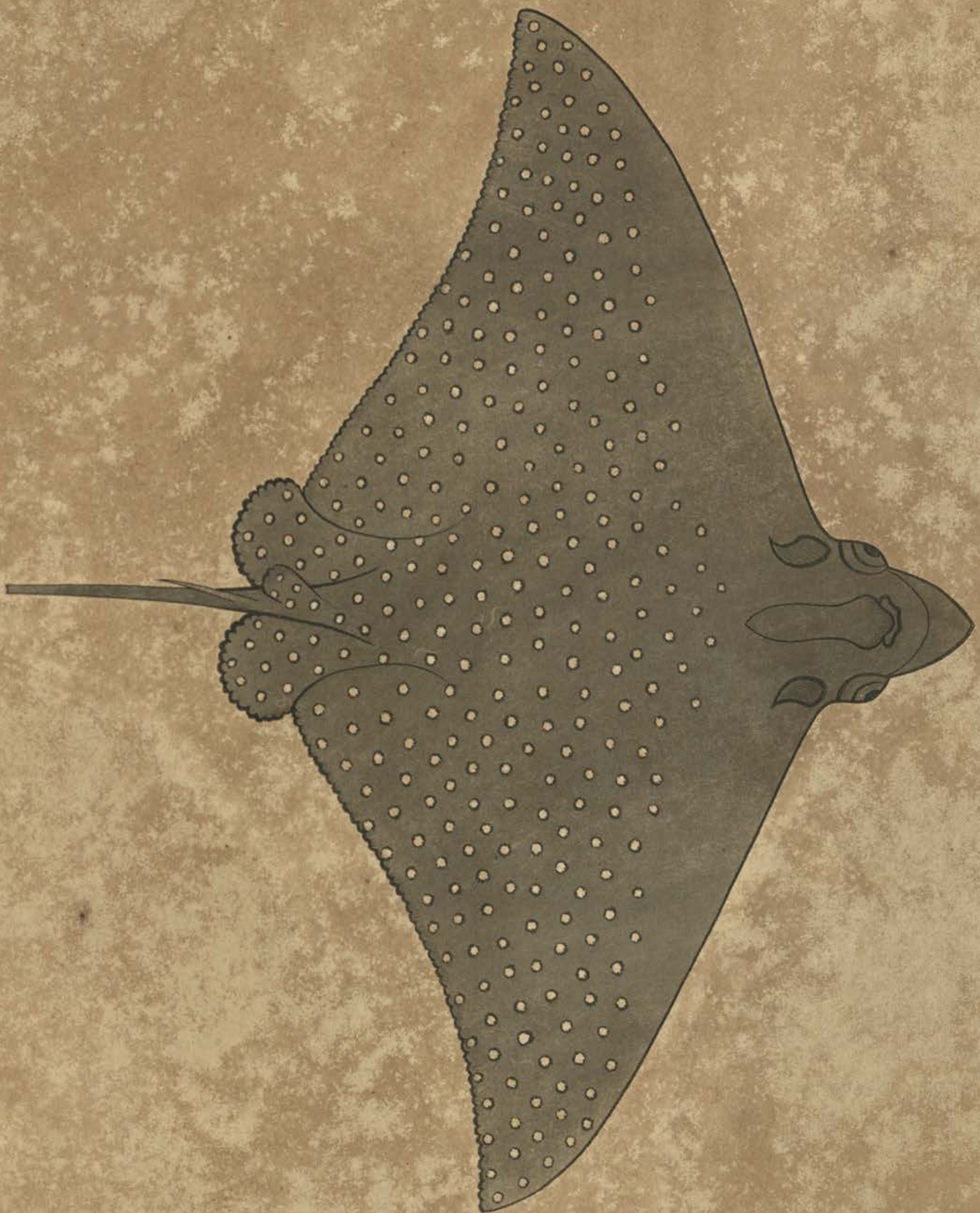
The *length*, from the rostrum to the beginning of the tail, six inches; the tail, one foot six inches and a half.



TENKEE KUNSUL.

MOOKARAH TENKEE.

R



EEL TENKEE.

EREE GOODOO TENKEE.

## No. VIII.

RAJA *ocellata; capite magno, exerto; rostro breve, sub-trigono; corpore glabro, lateribus (ut in R. Aquila) in angulum acutum desinentibus; pinna dorsi unica; cauda longissima, apterygia, spina munita.*

The ocellated RAJA, with a large projecting head, and short, sub-trigonal snout; the body smooth, and the sides expanding, as in the R. Aquila, end in a sharp angular point: one dorsal fin; the tail extremely long, without fin, but armed with a spine.

Called by the Natives EEL TENKEE.

THE *body* of this large Raja is exactly of the form of the Raja Aquila; but the head is flatter, projects more from the body, and, together with the rostrum, is somewhat trigonal: the rostrum short, soft, turning up a little at the point. The eyes large and protuberant, the pupil with a lateral direction; the foramina of a horn-form, with the crooked ends downwards. The mouth and nostrils below. The jaws dissimilar: the lower arched, narrow, and projecting beyond the wider immovable upper jaw; the edges of both are smooth, without teeth.

The *wings*, or lateral fins, on the posterior edge are fringed. The orbicular ventral fins, and the small dorsal fin, are also fringed. The solitary spine is at the top of the tail, immediately below the dorsal fin.

The *tail*, is of great length, tapering to a very fine point, and of a darker colour than the body. The *colour*, of the head and body, a dark ash; the latter spotted with numerous small, round, white spots, edged with black; the belly white.

| | Feet. | Inches. |
|---|---|---|
| The *length*, from the rostrum to the tail, - - - | 0 | 10 |
| of the tail - - - - - - - - - - - | 5 | 2 |
| from tip to tip, of the wings - - - | 2 | 10 |
| distance of the eyes - - - - - - - | 0 | $5\frac{1}{2}$ |

## No. IX.

RAJA *capite lato, depresso, rostro lunato, inter duos processus cartilaginosos, ab capitis lateribus (velut aures) exertos; corpore glabro, alato; dorso monopterygio; cauda brevissima, gracile, inermi.*

The RAJA with a broad, depressed head; a lunated rostrum, between two cartilaginous processes projecting from the sides of the head, in the manner of long ears; the body smooth, winged; a single dorsal fin; the tail most remarkably short, slender, without spine.

Called by the Natives EREEGOODOO TENKEE.

THE *sides*, extended in the form of wings, resemble the Raja Aquila, but the head and other parts are widely different.

The *back* is more convex, while the head can hardly be distinguished from the back. It is broad, flat, scarcely convex, and terminates in a thin, broad, lunated rostrum, between two singular processes, which, rising from the side of the head, project about two inches beyond the crescent of the rostrum. These,

when stretched out, are flat, oblong, lanceolate, consisting of a white cartilaginous substance, striated like the lateral fin, and on the inside checkered black and white; exteriorly, they are of the same colour with the back. When half curled up, they bear a resemblance to two ears; but, when more closely contracted, to two horns.

The eyes lateral, near the base of the above processes, round, flat, proportionally not large; the pupil perpendicular, oblong-oval, narrow. The usual foramina behind the eyes, are here wanting.

The nostrils beneath, gaping, a little more advanced than the eyes. The mouth three-fourths of an inch behind, more than three inches long, straight, linear, with a narrow stripe of granular teeth, in each jaw.

Two oblong, rounded, ventral fins; a triangular dorsal fin situated high at the beginning of the tail; the tail remarkably short, slender, and without either spine or fin.

The *colour* of the back, an uniform dark-brown, the belly whitish.

| | Feet. | Inches. |
|---|---|---|
| The *length*, from the rostrum to the dorsal fin - - - | 1 | 1 |
| from tip to tip of the lateral fins - - - | 4 | 5 |
| length of the tail - - - - - - - - - | | 8 |
| distance between the eyes - - - - - | | 5 |

## REMARKS.

The specimen now described was brought to me in the month of February, 1788. I never saw another. The fishermen asserted that it was very rarely met with, which they are very apt to say, by way of enhancing the value of what they bring. In the present instance, however, I have reason for thinking they spoke the truth.

I have since my return to England, received a drawing from St. Helena, of a fish caught there which appears to be exactly the same species, only much larger in size. It was sent to me by Mr. Brooke, the Governor. In order to show the mouth, and under parts of the fish, I had Mr. Brooke's drawing reduced, and have given an engraving of it.

The only account I have met with, of this singular fish, is in the Third Volume of Duhamel. Traité general des Pesches, Sect. ix. p. 293. Pl. XVII.

# No. X.

RAJA *corpore oblongo; rostro productiore; aculeis reflexis ordinatim in medio dorso macula, nigra aliis albis circundata, prope pinnas pectorales; cauda pinnata, inermi.*

The RAJA with an oblong body, the rostrum elongated and pointed; a series of reflex prickles on the middle of the back, and a black spot, surrounded by three or four white spots, near each pectoral fin; the tail pinnated, unarmed.

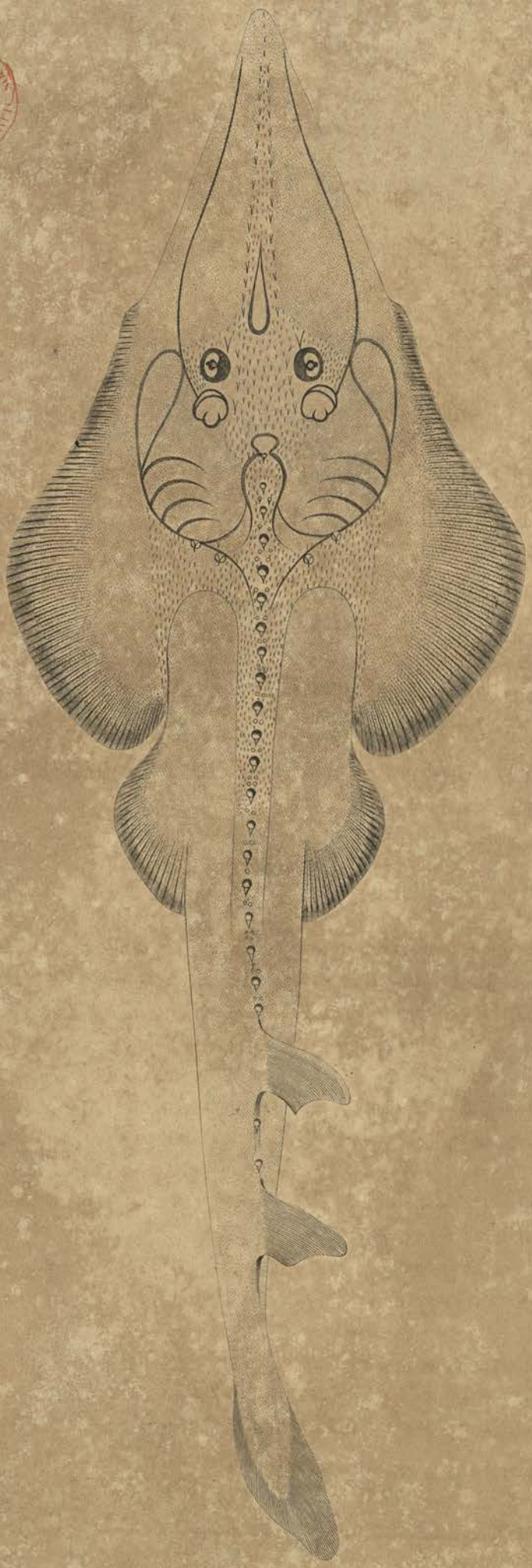
## Called by the Natives WALAWAH TENKEE.

THE *body* oblong, roundish, the lateral fin on each side slanting towards the tail, angular, not rounded, the posterior angle and interior edge distinctly separate from the body, and distant from the ventral fin.

The *head* broad, very little convex; the rostrum very long, trigonal, channelled, pointed. The eyes small, oval, in deep orbits, the anterior edge of which is set with small prickles; the foramina behind, oval, with a small dent. The mouth and nostrils beneath; the teeth granulous.

The *trunk*. A regular line of prickles, runs along the ridge of the back, and others, on each side, are disposed in opposite pairs; behind which, are three round white spots, at equal distances, on each side of the prickly line. On each lateral fin, is a larger oval, black spot in the middle of three or four white spots, like those on the back.

WALAWAH TENKEE.



SUTTIWARAH

The *fins*. The two distinct ventral fins are rather distant from the lateral, and of the same triangular form; The first dorsal is nearly opposite to the ventral, the second two inches lower down: both are falcate, at the anterior as well as posterior edge, but the posterior point is obtuse. The tail becomes rounder below the first dorsal, and tapers rapidly to the caudal fin, which is long, broad, and obliquely falcate.

The *colour* of the fish a light brown. The skin, when stroked upwards, has a harsh rough feel, but a soft, velvet-like feel, when stroked downwards.

| | Inches. |
|---|---|
| The *length*, from the point of the rostrum to the dorsal fin - - - | $8\frac{1}{2}$ |
| from the dorsal fin to the point of the tail - - - - - - | 9 |
| from the orbit to the point of the rostrum - - - - - | $4\frac{1}{4}$ |

REMARKS.

This fish, in some respects, resembles the Raja rhinobatos, but is widely different in others. The spots on the lateral fins, and on the back, render it remarkable.

## No. XI.

RAJA *corpore oblongo; rostro productiore, acuto, aculeis reflexis duplice serie exasperato, tuberculis spinosis, ordine unica in medio dorsi dipterygii; cauda pinnata.*

The RAJA with an oblong body; an elongated, pointed rostrum, armed with a double row of reflex prickles; a single row of spinous tubercles along the middle of the back, and between the two dorsal fins; the tail pinnated.

Called by the Natives SUTTIWARAH.

THE *body* oblong, depressed.

The *head* broad, and flat, but raised sufficiently from the surface to be distinguished from the body, and lines corresponding to the spiracula, are visible behind. The rostrum long, trigonal, pointed, with two diverging rows of prickles in the middle, extending from near the edge of the foramina; similar prickles are thick set between the eyes, and on the sides. The eyes and foramina, the mouth, teeth, and nostrils, as described in the last subject. The *trunk*. A row of spinous tubercles, on the middle of the back, are continued as far as the second dorsal fin: small prickles and smooth tubercles being interspersed.

The *fins*. The lateral fin, rising higher than the eyes, at first bends gently in, but soon bellying outwards, forms a lobe nearly semicircular on each side. The ventral are immediately behind, much smaller, but of the same shape, and form a second circular expansion. The two dorsal fins are on the middle of the tail, with two spinous tubercles between them; the caudal is oblique, and entire.

The *colour*, a light brown, the underside as usual, white.

| | Inches. |
|---|---|
| The *length*, from the point of the rostrum to the tail - - - - | 8 |
| of the tail - - - - - - - - - - - - | 7 |
| from the eyes to the point of the rostrum - - - | $3\frac{1}{4}$ |

REMARKS.

The spinous tubercles on the back, somewhat resemble those on the Raja oxyrinchus.

# SQUALUS.

## GENERIC CHARACTER.

*Spiracula* v. *ad latera colli, corpus oblongum, teretiusculum. Os in anteriore parte capitis.*

Five spiracles at the side of the neck; the body oblong, roundish; the mouth in the anterior (and under) part of the head.

## No. XII.

SQUALUS *capite latissimo, transverso, malleiformi.*

The SQUALUS, with a very broad, transverse, hammer-like head.

*Squalus Zygæna, Linn. S. N p.* 399.

Called by the Natives, KOMA SORRA.

THE singular form of the balance, or hammer-headed shark, sufficiently distinguishes it, not only from others of the same genus, but from all other fish whatsoever. It has five spiracles on each side; the mouth is furnished with several rows of teeth; the eyes large, and the apertures behind them oblong; the anal and hinder dorsal fins small.

The subject drawn, measured twenty-two inches.

### REMARKS.

They are seldom found of a larger size at Vizagapatam; but are said, in other parts, to arrive to the size of four or five feet.

## No. XIII.

SQUALUS *rostro longo, ensiformi, osseo, plano, utrinque dentato, denticulis semisagittatis.*

The SQUALUS with a long, sword-form, bony, flat rostrum, denticulated on each side, the denticles half-barbed.

*Squalus Pristis, Linn. S. N. p.* 241.

Called by the Natives YAHLA.

THE teeth on each side of the long rostrum, are not exactly opposite to each other; all of them are bearded on the posterior side. The mouth beneath, and the five spiracula on each side, as in the rest of the genus. Teeth granular. The eyes large, oval, prominent. Nostrils oblique, near the base of the rostrum; the foramina behind the eyes, linear, slanting.

The back and sides convex, the breast and belly flat. The trunk from the first dorsal fin, diminishing rapidly, becomes rounder towards the tail. The anus is situated between the ventral fins, and partly covered by a membrane.

KOMA SORRA.

YAHLA.

PALA SORRA.

SORRA KOWAH.

The situation and shape of the fins, as expressed in the figure; the inferior lobe of the caudal fin somewhat falcate.

The upper part of the head, back, and sides, dusky; the belly and parts below whitish.

| | Inches. | Lines. |
|---|---|---|
| *Length*, from the root of the rostrum to the caudal fin - - - - - - | 14 | 6 |
| to the first dorsal fin - - - - - - - - - - - - | 7 | 6 |
| from the first to the second dorsal fin - - - - - - - | 2 | 8 |
| of the rostrum - - - - - - - - - - - - | 7 | 6 |
| of the caudal fin - - - - - - - - - - - - | 2 | 8 |
| distance between the eyes - - - - - - - - - | 1 | 0 |

REMARKS.

This and the Zygæna are rather rare at Vizagapatam, and are seldom brought larger than twenty inches, or two feet, in length. I never happened to meet with either at sea.

## No. XIV.

SQUALUS *corpore sub-rotundo; foraminibus ad oculos nullis; dentibus acutis.*

The SQUALUS with a roundish body; no apertures behind the eyes; the teeth sharp.

Called by the Natives PALA SORRA.

THE *head* oblong, depressed; rostrum obtuse, thin, pellucid. The mouth, about an inch and a half from the point of the nose, set with teeth in several rows.

The *fins*. The pectoral or lateral fins, close to the posterior spiracula; the first dorsal rises half an inch farther back, and the second (which was very small) two inches from the first; the anal, a little before the second dorsal; the slanting extremity of the caudal fin emarginate.

The *colour*, of the upper parts, darkish; of the belly, a dull white. The skin appears to be smooth, but feels rough when stroked upwards.

The subject measured eight inches, from the point of the rostrum to the tail; the caudal fin three inches.

## No. XV.

SQUALUS *foraminibus nullis ad oculos; naribus remotioribus; pinna caudali obliqua, integra.*

The SQUALUS with no apertures behind the eyes; the nostrils distant; the oblique caudal fin entire.

Called by the Natives SORRA KOWAH.

THIS differs chiefly from the last in the distance of the nostrils from the eyes; and the size and shape of the caudal fin. In the want of the foramina in the mouth, teeth, the disposition of the fins, and roughness of the skin, they agree. There is no visible lateral line.

The *colour*, is a little lighter than the former.

| | Inches. | Lines. |
|---|---|---|
| The *length* to the tail - - - - - - - - | 9 | 0 |
| of the caudal fin - - - - - - - | 3 | 6 |

## No. XVI.

SQUALUS *cirro ad nares; corpore fasciato; pinna ani nulla; cauda quam corpus longiore.*

The SQUALUS with a cirrus at each nostril; the body variegated by cross bands; no anal fin; the tail longer than the body.

Called by the Natives BOKEE SORRA.

THE *head* nearly as broad as the body, compressed, convex above, flat beneath; the crown a little depressed, rostrum soft, not transparent. The mouth, (as in the genus) beneath, three-fourths of an inch from the point of the rostrum; the nostrils close to the mouth, wide, with a short cirrus pendent from the interior edge of each; the eyes oval, pupil linear, transverse: behind each, there is a lunated aperture. The fifth spiraculum is covered by a membrane from the fourth, in a manner to be easily overlooked.

The *trunk* short, oblong, tapering from the pectoral fin; the sides a little compressed, but becoming round at the dorsal fin, and tapering gently, it terminates in the long, flat tail. The skin rough.

The *fins*. The pectoral large, nearly orbicular, extending as high as the second spiraculum; the roundish ventral fins rise about an inch and a half behind them; the first dorsal rises nearly two inches from the left spiraculum, and the second about two and a fourth from the caudal; the spinal portion of the caudal fin, thin, and narrow, uniting with the acuminated, angular, terminal portion; the lower portion is seemingly divided into two lobes, of which the posterior is the longest and broadest.

The *colour* above, a dusky brown, intersected, from the root of the rostrum to the point of the tail, by twelve or thirteen broad fasciæ of a brighter brown. The belly a dusky white.

The *length*, from the nose, to the point of the tail, thirteen inches.

## No. XVII.

SQUALUS *cirro ad nares; corpore non fasciato; pinna anali nulla; cauda quam corpus longiore.*

The SQUALUS with a cirrus at each nostril; no anal fin; the tail longer than the body; no fasciæ on the body or tail.

Called by the Natives RA SORRA.

THIS in its form and all the other characters agreeing with the species last described, was not drawn: the only difference was in the *colour*, which was a darkish gray, without any fasciæ; the belly whitish.

The *length*, nineteen inches.

BOKEE SORRA.

POOLLEE MAKUM.

## No. XVIII.

SQUALUS *corpore sub-rotundo, brevi, vario; pinna anali; pinna caudæ longissima, apice rotundata, emarginata.*

The variegated SQUALUS, with a short, roundish, body; an anal fin; the caudal fin extremely long, rounded, and emarginated at the point.

Called by the Natives POOLLEE MAKUM.

THE *body* oblong, short, somewhat depressed, till near the dorsal fin, where it becomes rounder, without diminishing much in thickness, and terminates in a long flattish tail. The skin when stroked downwards, feels like velvet, but harsh when stroked in a different direction.

The *head* broader than the body, depressed above, flat beneath, sides convex. Mouth small, less than an inch distant from the edge of the rostrum; lips thickish. The jaws rough like a file.

Eyes very small, oval; the foramina behind them, also small, kidney-shape. Nostrils close on the edge of the rostrum, wide, gaping, with a small cirrus from the posterior, interior, edge.

The spiracula high, in respect to the pectoral fins, the fourth, on each side, is divided in the middle.

The *fins*. The pectoral large, oblong-ovate; the first dorsal opposite to the ventral, the second opposite to the anal; both are oblong and obtuse; the small ventrals are about an inch behind the pectoral, and about the same distance from the anal, the point of which nearly touches the inferior portion of the caudal fin: both ventral and anal are in shape similar to the dorsal fins. The caudal is very long, the spinal or upper portion thin, narrow, the point rounded, and emarginate; the ventral portion thicker and broader, notched four inches from its rise near the anal fin, and a second time near the point.

The *colour* of the upper part of the head and back almost black; that of the tail a dusky brown; both remarkably variegated, with whitish fasciæ, marks, and spots, which look at first sight like an Egyptian inscription. They were seldom found to vary in shape, and, being accurately copied from life, are exactly represented in the figure: as they approach the tail, they grow fainter. The under parts of the fish are of a yellowish white.

The *length*, from the rostrum to the end of the tail, thirteen inches.

### REMARKS.

The three last-described species seldom appear at Vizagapatam, and were never found larger than above mentioned.

The present species is the 19th in Gmelin's edition of Linnæus, and named Tigrinus; by Bloch it is named Fasciata.

# LOPHIUS.

## GENERIC CHARACTER.

*Spiracula solitaria pone brachia; dentes plurimi minuti; pinnæ pectorales brachiis insidentes; branchiæ tres tantum.*

Solitary spiracles behind the arms; numerous small teeth; the pectoral fins seated on the arms; the branchiæ three only.

## No. XIX.

LOPHIUS, *processu erecto, setaceo, apice clavata, mobile, ab labio superiore; corpore alepidoto, cute tenui, laxa, tecto; pinnis pectoralibus in brachiis longis.*

LOPHIUS, with an erect, setaceous, moveable process, clubbed at the point, rising from the upper lip; the pectoral fins on long arms.

Called by the Natives KAPPA MURA MOIA.

*Lophius Histrio Linn. S. N. p.* 402.

*D.* 1. 1. 12. *P.* 10. *V.* 5. *A.* 7. *C.* 10.

THE shape of this singular animal will be better collected from the figure, than from a description. The mouth large, oblique; the upper jaw longer than the under, both have a double row of close-set, small teeth; the tongue hard, obtuse. From the middle of the upper lip arises an erect cirrus, half an inch in length, with an oblong, pappy, club head, streaked (like a porcupine quill) alternately dusky and white; from the rostrum, a little behind this, arises a small rough, somewhat-curve, cartilaginous process, growing thicker gradually towards the end, which is set with short hairs; and a second of the same kind, but a little longer and more curved, lies reclined upon the ascending ridge of the back; between these, and immediately above the eye, is a deep depression of the crown. The eyes are remarkably small, and of a beautiful emerald colour.

The dorsal fin consists of twelve rays, rendered less distinct by the rough skin, which is without scales, and every where hangs very loose. The ventral fins are very small, but like the others adipose at the roots. The ten rays of the pectoral fin at the end of the arm, resemble fingers. The caudal fin is round. The solitary branchial spiracula are behind the arms.

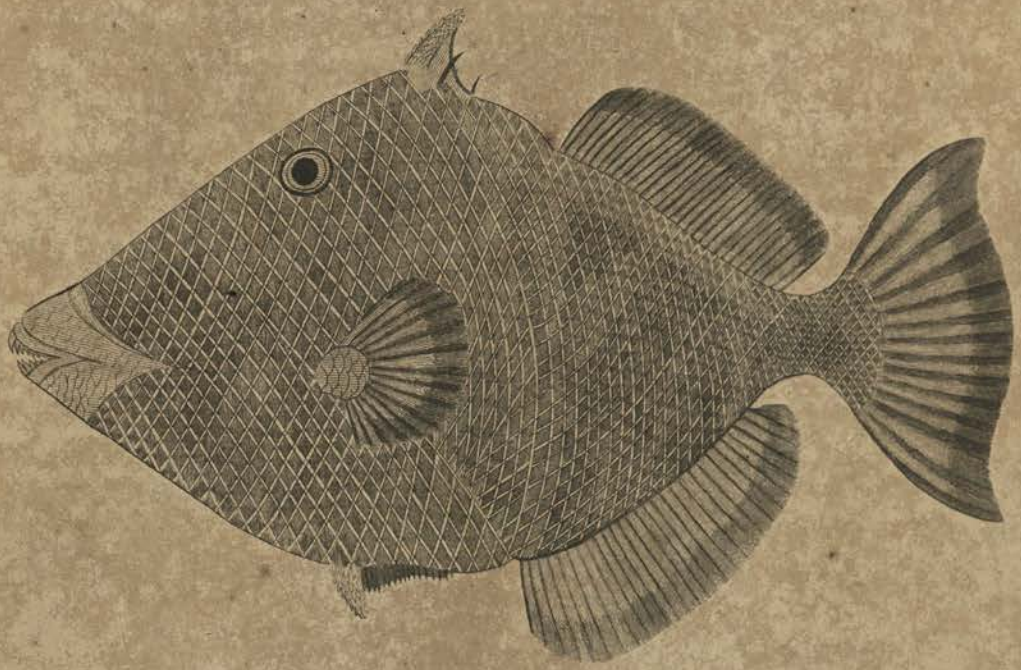
The *colour* a yellowish white variegated with black streaks, the fins also are streaked, or spotted. The belly reddish.

The *length*, three inches and a half.

### REMARKS.

What I have described as a process, I find is reckoned by Gronovius, the first dorsal fin.

XIX.



XX.

XIX. KAPPA MURA MOIA.

XX. RAHTEE YELLAKAH.

# BALISTES.

## GENERIC CHARACTER.

*Caput compressum; dentes utriusque* 8; *horum anteriores* 2 *longiores; utrinque* 3 *interiores intra totidem laterales, adpressi; apertura supra pinnas pectorales. Corpus compressum, squamis corio coadunatis. Abdomen carinatum.*

The head compressed; eight teeth in each jaw, of which two in front are longest, the three interior, on both sides, rest between an equal number of lateral teeth; the branchial aperture above the pectoral fins. The body compressed, the belly carinated; the scales fixed on a coriaceous skin.

## No. XX.

BALISTES *pinna dorsali anteriore triradiata, radio primo osseo, breve, crasso, aspero, retuso, antice serrato; pinna caudali integra, sub-flexuosa.*

The BALISTES with a three-rayed anterior fin, of which the first ray is a short, rough, thick bone, with a ragged point, and serrated on the fore part; the tail undivided, somewhat flexuous.

Called by the Natives RAHTEE YELLAKAH.

$D.\ \frac{3}{3}.\ 30.\ P.\ 15.\ V.\ \frac{14}{14}.\ A.\ 28.\ C.\ 14.$

THE *body* very compressed, thin, broad, and short; the skin rough, reticulated, with a few contiguous square scales, on the rostrum. The head, at first, of equal breadth with the body, and not less compressed on the sides, declines in an oblique line from the dorsal fin to the mouth, from which, in another oblique line, but rather shorter, it declines to the ventral fin. The mouth is situated at the point of the triangle, very small, the lips thickish; the two fore teeth in each jaw remarkably long. The eyes near the vertex, distant from the rostrum. No visible nostrils.

The back slanting from the first dorsal fin to the tail, with the opposite ascending line from the ventral fin, compose a triangle somewhat longer than that of the head. The tail, at the termination of the dorsal fin, is much contracted, but expands somewhat towards the fin. There is no lateral line. The anus remarkably long.

The *fins*. The first spine of the dorsal is thick, strong, serrated, with a rough point, as if broken; the other two rays are small and short, but sharp pointed; the second dorsal is situated three fourths of an inch behind on the declivity of the back; the short roundish pectoral is placed nearly in the middle between the eye and ventral fin; the first spine of the ventral exactly resembles that of the first dorsal; the white points of the others just appear above the edge of the connecting black membrane; the anal is opposite to the second dorsal; the caudal is undivided, rounded somewhat in the middle, and sinuated on each side.

The *colour* of the body darkish; the second dorsal, anal, and caudal fins, bluish; the membranes feel to the touch like thin leather.

| | Inches. | Lines. |
|---|---|---|
| The *length*, from the rostrum to the end of the caudal fin - - - | 8 | 0 |
| greatest breadth - - - - - - - - - - - - - | 3 | 8 |
| from the eye to the point of the rostrum - - - - - | 2 | 8 |

## No. XXI.

BALISTES *spinis binis verrucosis loco pinnarum ventralium; pinna prima dorsi macula atra, radiis spinosis* 4-5, *quorum anterior prelongus, verrucosus, serratus, sub-rectus, acutus, sub-retroflexus; pinna caudali profunde bifida.*

The BALISTES with two rugged spines in place of ventral fins; the anterior dorsal fin marked with a large black spot, and consists of four, or five, spinous rays, the first of which is very long, rugged, serrated, nearly straight, sharp, bending a little backwards; the tail deeply forked.

Called by the Natives BOWREE, or ABATOO.

$D.\ \frac{5}{5}.\ 25.\ P.\ 14.\ V.\ \frac{2}{2}.\ A.\ 20.\ C.\ 16.$

THE *body* compressed, thin, very broad, between the first dorsal fin and ventral spines, narrowing gradually to the end of the second dorsal fin, where it tapers rapidly, and from flat becomes round. There are no scales but the skin is harsh and rough like shagreen.

The *head* nearly as broad as the body, much compressed; but, narrowing equally above and below from the vertex and the ventral spines, it forms a triangle ending obtusely in the short round rostrum, at the end of which the very small mouth is placed. The lips thickish; the jaws very short, equal, not extractile. The teeth close, a little bent and truncate, the two middle in each jaw the longest, and behind them are two tubercular teeth. The tongue cartilaginous, oblong, rounded, immoveable.

The eyes near the vertex, oval, in a deep socket, the iris golden and pearl colour; the nostrils double, a little before the eyes, small, oval, open, the posterior largest.

The linear branchial aperture is directly before the pectoral fin.

The *trunk:* the back rising in an arch from the vertex, is carinate, and crowned by the first dorsal fin; from the beginning of the second dorsal, it declines towards the tail. The belly is flattish, and armed with a strong bone, to which the ventral spines are connected. This is moveable with the spines, covered with the skin, and extends backward nearly to the anus. The lateral line is high, at first arched like the back, but afterwards straight, running along the middle of the tail.

The *fins.* The first dorsal is placed on the highest part of the back, consisting of one very strong spine, two inches and a half in length, straight, warty, serrated on both sides, and sharp-pointed; and of three (sometimes four) short spinous rays. The lower part of the front spine, and all the others with the connecting membrane, are black. The second dorsal is nearly one inch behind, on the declivity of the back, and terminates two inches from the tail; the pectoral in a line with the mouth, short, and rounded.

The two spines in the place of ventral fins are an inch shorter than that of the dorsal, but like it rough, and serrated; the anal rays gradually shortening, terminate on a line with the second dorsal; the caudal is deeply forked.

BOWREE *or* ABATOO.

LAMA YELLAKAH.

The *colour* of the back, when fresh from the water, is a dusky glittering yellow, but all below the line, that of burnished silver. The first dorsal fin is black and yellow, with a narrow white streak near the edge; the second dorsal and anal have a faint yellowish cast; the pectoral and caudal fins are yellow.

*Length* of the subject described.

| | Inches. | Lines. |
|---|---|---|
| From the rostrum to the caudal fin - - - - - - | 9 | 5 |
| the caudal fin - - - - - - - - - - | 2 | $2\frac{1}{2}$ |
| breadth from the dorsal to the ventral spines - - | 3 | 5 |

REMARKS.

These fish are caught in vast numbers after the month of May, so as to injure the nets; and being thrown away by the fishermen as useless, are often left to putrify in numbers strewed on the beach.

It is the Balistes Biaculeatus, in Gmelin's edition of Linnæus; and described by Gronovius, Mus. Ichthyol: No. 115.

## No. XXII.

BALISTES *pinna prima dorsali triradiata, radiis longis, spinosis, acutis, ultimo ab alteris remoto; radius primus pinnæ ventralis, osseus, crassus, asper, retusus; cauda lunata, varia.*

The BALISTES with the anterior dorsal fin of three long, spinous, sharp rays, of which the last is distant from the others; the first ray of the ventral fin, is a thick, rough bone, with a broken rugged point; the tail lunate and variegated.

Called by the natives LAMA YELLAKAH.

$D.\ \frac{3}{3}.\ 27.\ P.\ 14.\ V.\ \frac{1}{8}.\ A.\ 25.\ C.\ 12.$

THE *body* oblong, broad, compressed, ventricose, narrowing towards the tail, which is small and round. The skin leathery, reticulate, rough.

The *head* nearly as broad as the body, compressed, obtuse; the vertex a little depressed, the front sub-carinate, declining to the mouth; the mouth on a line with the pectoral fin, small, the lips thick; the jaws not extractile, set regularly with teeth, those in the front long. The tongue thick, soft, obtuse, the point sheathed. The eyes very high, distant from the rostrum, large, orbicular. The nostrils double, on the edge of a groove a little before the eye; both small, but (what is unusual) the posterior nostril smallest.

The *trunk*. The back, from the beginning of the first to the second dorsal fin, straight, it then declines to the tail; the sides compressed; the abdomen prominent. The lateral line imperceptible, except a little on the tail, where it appears straight and carinate. The anus is nearer the tail than the head.

The *fins*. The three rays of the first dorsal fin are rough, long, and sharp, reclining when not erect, into a deep groove: the posterior ray is at a considerable distance from the other two; the second dorsal is situated on the declivity of the back, exactly opposite to the anal, both being of the same length; the short, roundish, pectoral fin, is situated immediately behind the branchial aperture; the ventral two inches further back, its first ray, a strong, rough, short bone; the anal rises very near it, and is continued to the tail; the caudal is lunate.

The *colour* of the head and trunk dusky, sprinkled below the pectoral fin with small, oval, light yellow

spots; the second dorsal and anal fins are striped with yellow, whitish, and dusky lines; the caudal fin is remarkably variegated with the same colours disposed in various shapes.

| | Feet. | Inches. | Lines. |
|---|---|---|---|
| The *length* from the rostrum to the middle edge of the caudal fin - - - | 1 | 3 | 0 |
| greatest breadth - - - - - - - - - - - - - | 0 | 5 | 6 |
| distance of the eye from the rostrum - - - - - - - - - | 0 | 2 | 4 |
| dorsal spine - - - - - - - - - - - - - - - - - | 0 | 1 | 5 |

## No. XXIII.

BALISTES, *pinna dorsali anteriore triradiata, radiis spinosis robustis, ex æquo distantibus; cauda lunata, non maculata nec fasciata.*

The BALISTES with the first dorsal fin, consisting of three spinous rays at equal distances, the tail lunated, without bands or spots.

Called by the Natives SOMDRUM YELLAKAH.

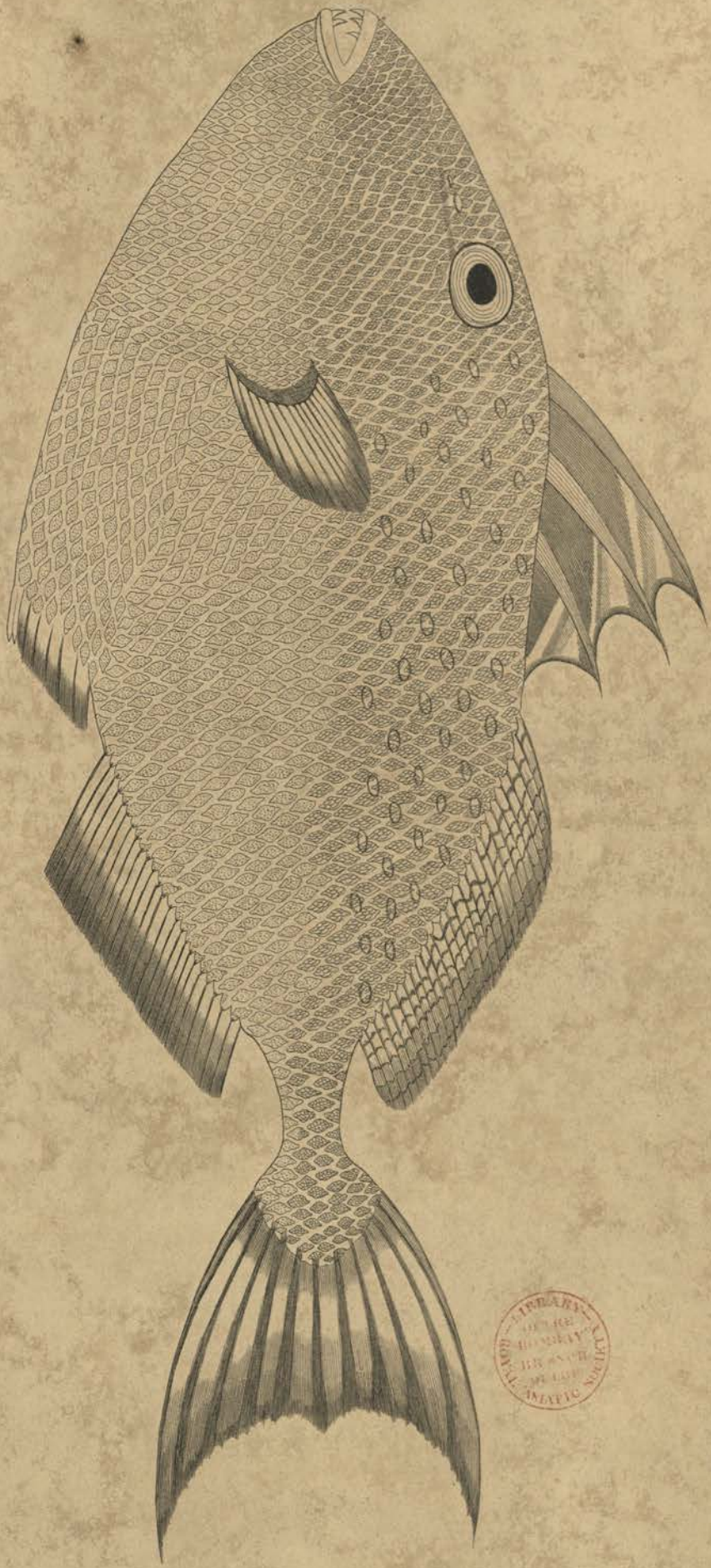
$D.\ \frac{3}{3}.\ 28.\ P.\ 15.\ V.\ \frac{1}{8}.\ A.\ 25.\ C.\ 12.$

THIS fish agreeing in its general form, the disposition and number of its fins, as well as in most other respects, with the one last described, it will be sufficient to mention the most material circumstances in which they differ.

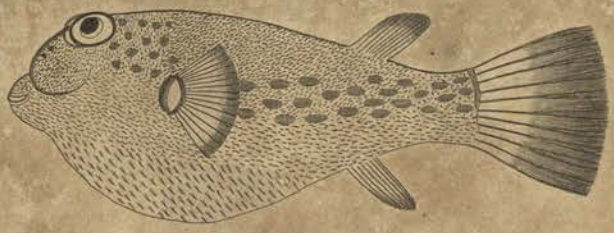
The *head* towards the point is more ovate, and the mouth higher, the eyes oval, the posterior nostril much larger than the anterior; the last of the three rays of the first dorsal fin is not distant from the other; the pectoral fin is more central. The second dorsal fin only is streaked, as in the former, the anal and caudal being without streaks.

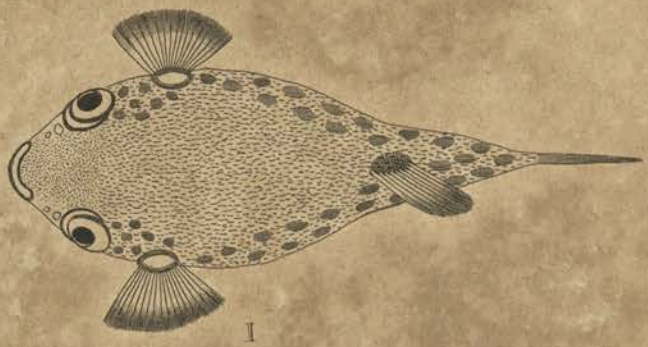
The *colour* here is not dusky but greyish; and the spots which in the former, were below the pectoral fin, are here above it, and of a fainter yellow. The narrow stripes, on the second dorsal, are yellow and white, like those on the anterior fin.

| | Feet. | Inches. | Lines. |
|---|---|---|---|
| The *length* from the rostrum to the middle of the caudal fin - - | 1 | 0 | 0 |
| greatest breadth - - - - - - - - - - | 0 | 4 | 6 |
| distance of the eyes from the rostrum - - - - - - | 0 | 2 | 4 |
| length of the first dorsal fin - - - - - - - - - | 0 | 2 | 6 |



SOMDRUM YELLAKAH





I

II

# TETRAODON.

## GENERIC CHARACTER.

*Maxillæ osseæ, porrectæ, apice bipartitæ. Apertura linearis. Corpus subtus muricatum. Pinnæ ventrales nullæ.*

Bony, projecting maxillæ, divided at the apex. The branchial aperture linear; the under part of the body rough with prickles; no ventral fins.

## No. XXIV.

TETRAODON, *corpore oblongo, compresso, ocellato; ore exerto; abdomine ventricoso muricato; cauda integra.*

The spotted TETRAODON, with an oblong, compressed body; the mouth pouting; a prominent, murexed belly; and an undivided tail.

Called by the Natives KAPPA.

*D.* 10. *P.* 17. *V.* 0. *A.* 8. *C.* 11.

THE *head* short, compressed, the front thick, prominent; the mouth small; the maxillæ projecting, are divided in the middle and, as in this genus, form the teeth, two above and two below. The eyes are close to the vertex, in a deep rough socket, large, oval. The nostrils double, roundish, in the middle between the eye and the rostrum. The solitary branchial aperture close to the pectoral fin, small, and a little curve.

The *trunk:* the back from the vertex, almost straight to near the dorsal fin, when it declines gently; it, as well as the sides, feels rough to the touch, but the belly is set with visible spiculi. There is no lateral line. The anus remote, or very distant from the head.

The *fins:* the dorsal and anal are opposite to each other, near the tail; the pectoral fins are on a line with the mouth, fan-form when extended; the caudal undivided, oblong-square. The ventral fin (as in this genus) wanting.

The *colour:* the back and sides are of a dark colour, spotted with pale bluish dots on the shoulder, but with oval spots behind the pectoral fin; the belly a bright yellow.

The *length,* from the rostrum to the end of the tail, four inches, three lines.

## No. XXV.

TETRAODON, *corpore pulchre maculato, antice muricato; cauda oblonga, integra.*

The TETRAODON with a body beautifully spotted; the breast rough with prickles; the tail oblong, undivided.

Called by the Natives KAPPA.

*D.* 10. *P.* 17. *V.* 0. *A.* 8. *C.* 11.

THE *body* oblong, compressed, somewhat angular, polished.

The *head* compressed, above depressed, the front steep. The mouth very small, the lips thickish, loose; the maxillæ extractile, and divided instead of teeth. The tongue thick, obtuse, sheathed at the point. The eyes low, or distant from the vertex: the nostrils near the orbit.

The *trunk:* the back rises a little in the middle, but declines rapidly from the dorsal fin; the abdomen is not nearly so prominent as in the preceding fish, but prickly; the position of the fins, and the number of rays in each respectively are the same.

The *colour* of the upper part a dark purplish, beautifully variegated with dusky whitish, or greenish spots, and two or three dark transverse bands; the throat and belly white, with a streak of yellow on each side. The dorsal fin dark, the caudal almost black; the anal of a light colour.

| | Inches. | Lines. |
|---|---|---|
| The *length* - - - - - - - - - | 3 | 5 |

REMARKS.

Both these fish are common, and are never found to vary more than an inch or two in size.

When the latter is fresh caught, the back resembles one of the large spotted shells commonly brought from India; but it loses its gloss when the fish dies.

## No. XXVI.

TETRAODON, *corpore ovato-oblongo, toto hispido; cauda oblonga cuspidata.*

The TETRAODON with an ovate-oblong body, covered entirely with prickles; the tail oblong, sword-pointed.

Called by the Natives KAPPA.

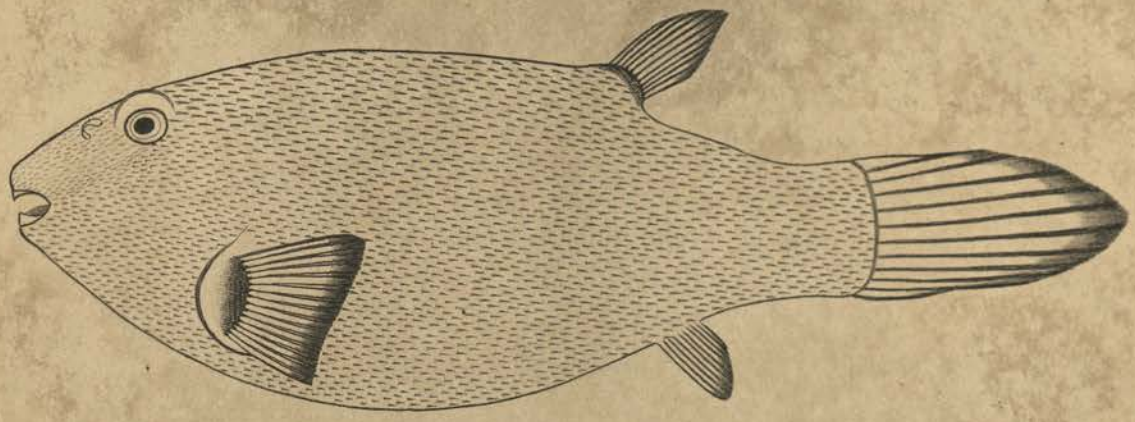
*D.* 11. *P.* 16. *V.* 0. *A.* 10. *C.* 12.

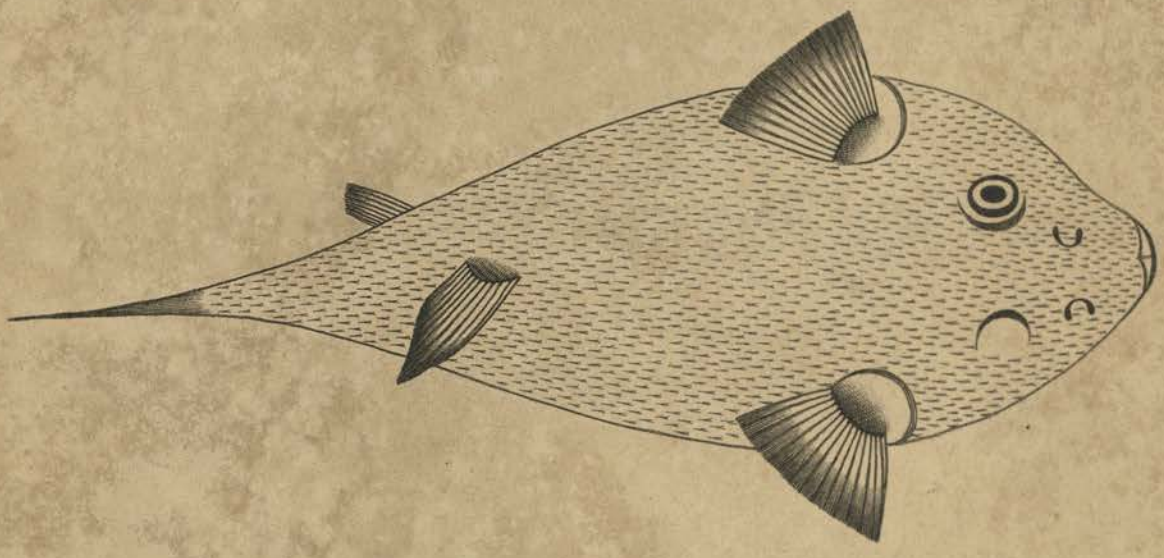
THE *body* ovate-oblong, roundish, thickish, every where covered with small soft bristles.

The *head* sub-ovate, small, rough. The mouth terminal, small; lips loose, thickish; the jaws extractile. A solitary eye on the left side, with only a faint mark of an orbit on the other: situated high, near the vertex, oval. The nostrils tubular, and singularly joined. The branchial aperture covered by the skin. The back, sides and abdomen, convex, but the latter when inflated greatly changes its shape; the tail oblong, broad, compressed.

The *fins*: the dorsal remote; the anal still nearer the tail: both are small; the former lanceolate, the latter round edged. The pectoral fin, when spread, appears obliquely truncate; the caudal long, broad, sword-shape.

| | Inches. | Lines. |
|---|---|---|
| *Length* - - - - - - - - - | 9 | 6 |





SOCIETY

KAPPA.

BONDAROO KAPPA.

CALAMARAH KAPPA.

REMARKS.

There was no appearance of the right eye ever having existed; but from the faint trace of an orbit, the defect was most probably a lusus naturæ. I never met with a second subject.

## No. XXVII.

TETRAODON *varius, corpore oblongo, subtereti, maculis rotundis, toto muricato; pinnis orbiculatis.*

The variegated TETRAODON, with an oblong, roundish, spotted, murexed body; the fins orbicular.

Called by the natives BONDAROO KAPPA.

*D.* 10. *P.* 18. *V.* 0. *A.* 10. *C.* 10.

THE *body* oblong roundish, compressed a little on the sides, every where armed with small prickles.

The *head*, thick, short, roundish; and the rostrum obtuse. The mouth higher than the pectoral fin; the lips thick, but readily expose the bony maxillæ. The eyes low, or further from the vertex than usual in this genus, small, orbicular. No nostrils were found; but, about an inch from each orbit towards the rostrum, were two soft, oval, papillæ of unequal size, joined together, without any visible aperture.

The *trunk*. From the vertex to the dorsal fin the back is slightly convex: from that fin to the tail, it declines obliquely and rapidly; the sides are full, or convex; the breast and belly round and prominent, swelling, when inflated, to a monstrous size. There is no lateral line. The anus nearer the tail than the head.

The *fins*. The dorsal is distant from the head, but the anal is still more remote; the pectoral low, or near the abdomen; the caudal is the largest: all the fins are nearly orbicular.

The *colour*. The upper part of the trunk very dark, or blackish, variegated with numerous round, light brown spots. The colour of the head is nearly that of the spots, variegated with lighter streaks. The spots on the caudal fin are like those of the back, on the other four fins they have a purple cast.

| | Feet. | Inches. | Lines. |
|---|---|---|---|
| The *length* of the subject, from the rostrum to the point of the caudal fin - | 1 | 3 | 6 |

## No. XXVIII.

TETRAODON *varius, maculis ovalibus, corpore oblongo-rotundo; ventricoso, toto muricato; cauda oblonga, rotundata.*

The variegated TETRAODON, with oval spots; the body oblong-rounded, universally murexed; the belly prominent; the tail oblong, rounded,

Called by the Natives CALAMARAH KAPPA.

*D.* 10. *P.* 18. *V.* 0. *A.* 11. *C.* 10.

THE *body* agrees nearly in form with the fish last described, but the belly being inflated, gives it still a more monstrous appearance; the skin is rather less hispid.

The *head* is longer, more compressed, but equally obtuse. The eyes are placed further back, near the vertex, large, and more prominent. There are no papillæ in front, and no visible nostrils.

The *trunk*. The back rises a little in a straight line to the dorsal fin, and then slopes, that fin being situated on the beginning of the declivity. The sides are convex; the abdomen, in the state it is drawn, enormous.

The *fins*. The situation of the fins the same as in the last fish. The pectoral are large and truncate, the other three oblong, rounded.

The *colour:* the head and trunk cineritious, spotted with oval, black, spots; the breast and abdomen white, with a faint yellowish tint. The fins (the pectoral excepted) spotted like the body: part of the tail is of a dusky red colour.

*Length* of the subject described, nineteen inches.

REMARKS.

The drawings of the two last fish have been reduced, but the proportions strictly preserved.

## No. XXIX.

TETRAODON, *corpore oblongo, glabro, dorso et abdomine exceptis; linea laterali insigniter infracta; cauda sub-lunata.*

The TETRAODON with an oblong, smooth body, the back and belly excepted; the lateral line remarkably infracted; the last sublunate.

Called by the Natives KAPPA KOORAWAH.

*D.* 13. *P.* 15. *V.* 0. *A.* 10. *C.* 11.

THE *body* oblong, and somewhat wedge-form, the back and breast a little rough, the rest smooth.

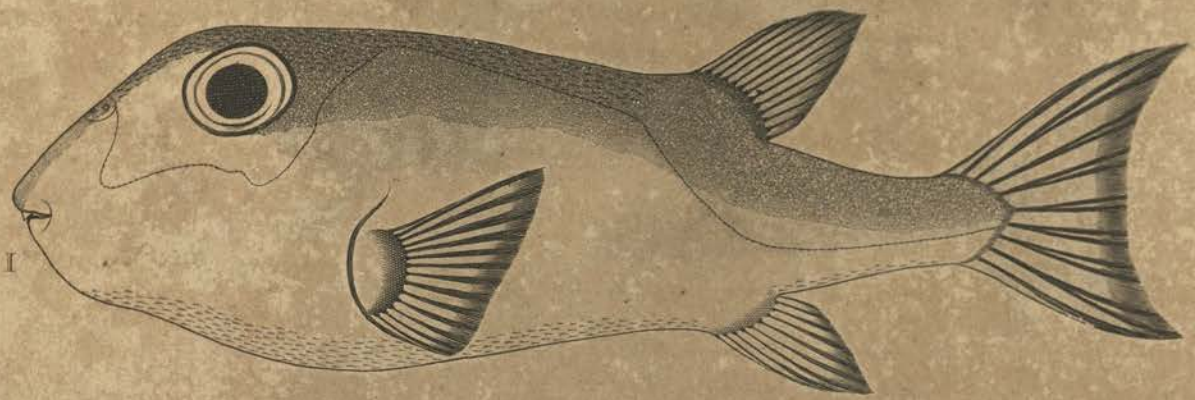
The *head* large, as broad as the body, depressed above, on the sides compressed, the front declining in an oblique line to the obtuse rostrum. The mouth terminal, but lower than the middle; the lips flaccid. The jaws extractile, the upper longer than the lower; teeth as usual in this genus. The tongue thick, obtuse, smooth, sheathed. The eyes large, roundish, high, covered by the skin of the head. The nostrils in the middle, between the orbit and rostrum, double, or, if single, divided by a valve.

The *trunk:* the back roundish, straight, somewhat rough before the dorsal fin; the tail small and round, the sides a little compressed and smooth; the belly prickly, prominent, and capable of great distention. The lateral line, singularly broken and irregular, is exactly represented in the figure. The anus behind the middle of the body.

The *fins:* the dorsal and anal are nearly opposite, the former a little broader, but both lanceolate; the pectoral larger, obliquely truncate; the caudal somewhat lunate.

The *colour* of the back and front dark; the sides a faint greenish-yellow, which brightens towards the breast and belly; the belly a stone white. The fins have a yellowish colour, the lower part of the anal and caudal excepted, which are whitish.

*Length* of the subject, 10 inches.



I

II

I. KAPPA KOORAWAH.

II. GOORAHPOO SUBBOOKOO.

# SYNGNATHUS.

## GENERIC CHARACTER.

*Caput oblongum, cathetoplateum: maxillæ lateribus clausæ, et os in extremitate rostri tantummodo apertum. Corpus longum, et admodum gracile; ambitu plerumque angulato, interdum subrotundo: jam tetrapterygium, jam monopterygium. Pinnæ ventrales nullæ.*

The head oblong, and compressed; the maxillæ are closed together at the sides, and the mouth has only a small opening at the extremity of the rostrum. The body is long, and very slender; for the most part angular, sometimes roundish; in some species there are four fins, in others one only. No ventral fins.

## No. XXX.

SYNGNATHUS *corpore medio hexagono; pinna ani carens; cauda pinnata.*

The SYNGNATHUS with the middle of the body hexagonal; no anal fin; the tail pinnated.

Called by the Natives GOORAHPOO SUBBOOKOO.

*Syngnathus Typhle Linn. S. N. p.* 416.

*D.* 30. *P.* 11. *V.* 0. *A.* 0. *C.* 8.

THE length of the subject nine inches; the laminæ of the trunk twenty in number, of the tail forty-one.

The appearance of the Syngnathus, with its slender and crusted body, is more that of an insect than a fish. The mouth is extremely small, and covered by the under jaw, which turning up at the point, and being longer than the upper, closes the mouth as with a lid. The dorsal fin consists of equal rays, the pectoral rounded; the tail undivided, the rays distinct and sharpish.

# PISCES APODES.

## FISHES WHICH WANT VENTRAL FINS.

## MURÆNA.

### GENERIC CHARACTER.

*Caput læve. Nares tubulosæ. Membrana branchiostega radiis* x. *Oculi cute communi tecti. Corpus teretiusculum, lubricum. Pinna caudæ coadunata dorsali anique. Spiracula pone caput vel pinnas pectorales.*

The head smooth; the nostrils tubular. The branchial membrane has x. rays. The eyes covered with the common skin. The body roundish, slippery. The dorsal, caudal, and anal fins united Spiracles behind the head, or pectoral fins.

### No. XXXI.

MURÆNA *unicolor, maxilla inferiore longiore.*

The MURÆNA of one colour; with the lower maxillæ longer than the upper.

Called by the Natives CHOWLOO PAMOO or MALGUMARU.

*Muræna Anguilla Linn. S. N. p.* 426.

THIS fish agreeing in all material points with the Eel in England, differs somewhat in colour. The head, back, and dorsal fin are nearly black; the throat and belly of a reddish or yellowish brown; the anal fin is of a lighter reddish brown than that of the belly.

The subject was from the Ankapilly Lake, and measured in length, twenty-one inches; but they are found of a much larger size.

### No. XXXII.

MURÆNA *pinnis pectoralibus carens; corpore purpureo obscuro, maculis parvis albidis.*

The MURÆNA without pectoral fins; of an obscure purple colour, spotted with small whitish spots.

Called by the Natives CALAMAIA PAUM.

THE *body* roundish, thick, long, tapering, and somewhat compressed; without scales, flabby and oily.

The *head* not broader than the neck, the front convex; the rostrum long, projecting like a bird's beak, triangular. The mouth very wide, straight; the upper jaw a little longer than the lower; both set with a regular

CHOWLOO PAMOO or MALGUMARA.

CALAMAIA PAUM.

row of sharp, reflex teeth; a solitary tooth in the palate. No tongue visible. The eyes at the root of the rostrum, small, oval, flattish. One nostril near the orbit, the other close to the two tubuli at the extremity of the rostrum.

The branchial membrane hidden, consists of six setaceous rays; the aperture very small.

The *trunk*. The back rounded, straight; the breast and abdomen bellied; the sides and tail sub-compressed. No lateral line visible. The anus near the middle.

*Fins*. There are no pectoral nor ventral fins; the dorsal rises near the hind head, is continued along the ridge of the back, and unites with the blunt pointed caudal, with which the anal being also united, the three form one undivided, adipose, or fleshy, very narrow fin.

The *colour*, is a darkish purple variegated with small white spots; amongst which some are interspersed in pairs, joined by narrow stripes. The spots on the face are smaller than the others, and the throat and opercula are marked with long oblique lines of darker purple.

The *length*, two feet one inch and a half.

REMARKS.

This fish, in the shape particularly of its head, approaches nearer to the figure of the Carolina *Muræna Maculata* given by Catesby, as also to the figure of the *Muræna Helena* given by Willoughby, than to the figure of the latter given by Bloch. In regard to mere colour and spots, Bloch has justly remarked, that in the Muræna Helena they admit of much variety; and he gives instances from Catesby, Plumier, and Cette.

Another fish, seemingly a variety of the same species, was brought under the same name. It differed only in the following circumstances: the eyes were rather orbicular than oval; there were two teeth in the palate, one behind the other, and the colour was a yellowish white marked with gray spots and dots. There was no drawing made of it.

Inches.

The *length*, - - - - - - - - - - 23

Both this and the former fish, were, by the fishermen asserted to be of a poisonous nature, and on that account never eaten. Neither, indeed, had an inviting appearance, the latter especially had a remarkably rank smell, though fresh caught.

Two other sea Murænæ caught in the large seine, were brought to me under the name Malagu Paum; of which, not having an opportunity of getting drawings made, I can only subjoin the descriptions.

## No. XXXIII.

MURÆNA *cirris duobus ad maxillam superiorem; punctulis tribus ad rostrum utrinque; cauda aptera.*

The MURÆNA, with two cirri at the upper jaw, one on each side; three small punctures on each side of the rostrum; no caudal fin.

Called by the Natives MALAGU PAUM.

*B.* *D.* 296. *P.* 13. *V.* 0. *A.* 200. *C.* 0.

THE *body* eel-form, without scales, slippery.

The *head* large, oblong, conical, sharp. The mouth moderate size; lips loose; the jaws sub-triangular, the under jaw shortest; the teeth granular, in several rows; and the palate rough with similar teeth. The tongue ovate, smooth, immoveable. The eyes middle, small, covered with the skin of the head. Nostrils at the point

of the rostrum, tubular, solitary, and on each side of the rostrum are three small apertures at equal distances. On each side of the upper jaw are two small, short cirri.

The branchial membrane was hidden; there being only a small linear aperture near the pectoral fin.

The *trunk* round, oblong, tapering. The lateral line, declining from above the pectoral fin, run along the middle of the side to the tail. The anus central, between the head and the tail.

The *fins*. The dorsal rising from near the hind head, terminates near the point of the tail: the rays almost of equal length, but somewhat shorter towards the end; the pectoral, short, and roundish; the anal, like the dorsal, terminates near the tail. The tail is a little compressed, and sharp pointed.

The *colour* a dusky yellowish, brightening a little on the belly.

| | Feet. | Inches. | Lines. |
|---|---|---|---|
| The *length* | 1 | 8 | 0 |
| Circumference where thickest | 0 | 5 | 0 |

This fish is eaten by the natives.

## No. XXXIV.

MURÆNA *dentibus granulosis; punctulis tribus, ad rostrum; cirris carens; cauda pinnata sub-rotunda.*

The MURÆNA with granular teeth; three small holes on each side of the rostrum; no cirri; a pinnated, roundish, tail.

Called by the Natives MALAGU PAUM.

THE *body* round, thick at the shoulders, tapers more in proportion than the Eel; the skin smooth, but streaked in a manner so as at first sight to resemble scales.

The *head* conical, but shorter than the former, and less sharp. The jaws nearly of equal length; the teeth granular; the tongue ovate, large, smooth moveable. The fore part of the palate set with granular teeth, the hinder part smooth. The eyes almost marginal, small, round. The nostrils single, near the orbit, and two tubuli at the extremity of the rostrum, with three small foramina on each side. The branchial membrane concealed; the small aperture is a little lower than the pectoral fin.

The *trunk*, the shoulders and belly round, full; the tail towards the end compressed. The lateral line not visible above, but on the tail is conspicuous and straight. The anus in the middle, large, round.

The *fins*. The dorsal, anal, and caudal fins, are joined; the former rises near the middle of the back, the second a little behind the anus; the caudal is narrow, and rounded at the point. The pectoral fin, consisting of thirteen rays, is small, roundish, and pointed.

The upper part of the head and body, are of a dusky dark colour, the belly of a dull leaden white.

| | Feet. | Inches. | Lines. |
|---|---|---|---|
| The *length* | 1 | 6 | 0 |
| The circumference where thickest | 0 | 6 | 5 |

DONDOO PAUM.

DONDOO PAUM.

## No. XXXV.

MURÆNA *pinnis carens.*

The MURÆNA without fins.

Called by the Natives DONDOO PAUM.

THE *body* roundish, eel-form, covered with a coriaceous skin, and terminating in a very small sharp-pointed tail.

The *head* very little broader than the neck, oblong, depressed above, compressed, or rounded on the sides, smooth; the rostrum short, obtuse.

The *mouth* of a moderate size; the lips simple; the jaws of equal length, set with a regular row of small teeth, but in the fore part of the under jaw, there are several rows, and in the palate two diverging rows. The tongue narrow, ovate, smooth, free.

The eyes very small, lateral, round. A single nostril near each orbit, but the subject having been sometime dead, no tubulous nostrils were observed at the rostrum. The opercula oblong; the aperture small, gular, semi-lunate; the branchial membrane, consisting of six rays, cannot be seen without dissection.

The *trunk* eel-form to the tail, which is somewhat compressed, and tapers to a small point. No lateral line; the anus remote.

The *fins.* No vestige of fins whatever.

The *colour* universally black.

| | Feet. | Inches. |
|---|---|---|
| The *length* from the rostrum to the anus - | 1 | 6 |
| of the tail - - - - - - - - | 0 | 5 |

REMARK.

It was taken in the Ankapilly lake. This does not seem to be the Muræna Cæca, of Linnæus, S. N. p. 426.

## No. XXXVI.

MURÆNA *rostro longiore; pinna caudæ dorsali analique unita.*

The MURÆNA with a long rostrum; the caudal fin united with the dorsal and anal.

Called by the Natives TALOO PAUM.

THIS fish was taken in a net, in the month of June, near Waltier. I had no opportunity of having a drawing made, and described it on the beach.

The *trunk* was rounder and more taper, than that of the Eel; till near the tail, where it became depressed; no scales, smooth, and of a shining golden colour. The circumference eight inches.

The *fins.* The pectoral very small, the dorsal rose from the hind head, and was continued to the tail; the anal, one half shorter, joined the caudal, which being partly torn, its shape could not be determined.

The *head* somewhat conical, smooth, depressed on the front, and elongated into a very long rostrum. The

mouth straight, very large; the jaws long, the upper somewhat shorter than the lower; lips thickish. The teeth numerous, dissimilar: in the fore part of the under jaw, they were long, lanceolate, reflex, on the sides straight and depressed, in two rows, between which were numerous small granular teeth; in the upper jaw the teeth smaller, and covered by the lip. The palate also with long awl-form teeth, and two tuberculous rows. The tongue awl-form, smooth, tied.

The eyes at the base of the rostrum, large, oval, covered with the skin of the head. A gaping, oval nostril, near each orbit, and two tubulous at the extremity of the rostrum. The branchial membrane had ten ossicles.

## No. XXXVII.

MURÆNA *pinnis pectoralibus carens; cauda apterygia cuspidata.*

The MURÆNA without pectoral and caudal fins; the tail terminating in a sharp point.

Called by the Natives MANTI BUKARO PAUMU.

THE *body* perfectly round, tapering to a sharp point, smooth, without scales.

The *head* long, narrow, depressed, projecting into a sharp pointed rostrum. The mouth large, lips thin, the upper jaw longest, both set regularly with teeth. The eyes vertical, small; the nostrils on the edge of the rostrum tubulous. On the crown behind the eyes, about a dozen of white punctuli form an arch, with two parallel lines projecting towards the nose.

The *trunk* round; the tail flattened a little towards the end, terminates in a point, without any fin. The lateral line straight. The anus in the middle.

The *fins*. The dorsal and anal very narrow; the first rises near the head, the other close to the anus: both are continued to very near the point of the tail. No pectoral fin.

The *colour* of the back brownish, with several transverse streaks tending to the lateral line; between which line and the belly, is a long bluish-gray streak.

The *length*, one foot.

MANTI BUKARO PAU MU.

TALA BON.

TALA BON.

# OPHIDIUM.

## GENERIC CHARACTER.

*Caput nudiusculum; dentes maxillis, palato, faucibus. Membrana branchiostega radiis* vii. *patula. Corpus ensiforme.*

The head without scales; teeth in the jaws, palate, and throat; vii. rays in the branchial membrane, mostly exposed. The body sword-form.

## No. XXXVIII.

OPHIDIUM *capite anguino; linea laterali loricata; pinna dorsalis analisque caudali connatæ; cauda lanceolata.*

The OPHIDIUM with a snake-like head; the lateral line rough; the dorsal and anal fins united with the caudal; the tail lanceolate.

Called by the Natives TALA BON.

THE *body* sword-form, smooth, without scales.

The *head* oblong, compressed, pointed, resembling a snake's head. The mouth large, straight; lips thick; jaws elongated, the under shorter considerably than the upper; in both there are long crooked teeth in front, with a regular row of straight teeth in the upper jaw, which is rough on both sides like a file; the teeth in the under jaw are smaller, and almost concealed by the lip. The eyes lateral, more advanced than the corner of the mouth, large, oval; nostrils in a groove between the orbit and the nose. The rays of the branchial membrane numerous, partly covered, but discernible through the thin opercula.

The *trunk* roundish; the belly thinner than the back; the tail somewhat compressed, and terminates in a very narrow, small, pointed fin. The lateral line sloping gently from the shoulder, becomes straight a little behind the pectoral fin, and runs along the middle of the body and tail; rough, and very conspicuous. The anus is nearer the head than the caudal fin.

The *fins*. The dorsal rises near the head, and is blended with the caudal and anal fins.

The *colour*. The back is of a changeable, darkish golden colour, which brightens under the lateral line, and is strewed with very minute black dots. The belly is white.

The *length* of the subject, one foot nine inches.

## No. XXXIX.

OPHIDIUM *cirris duobus ad gulam; pinna dorsalis analisque caudali unita; pinna caudæ setis duabus brevibus terminata.*

The OPHIDIUM with two cirri at the throat; the dorsal, anal, and caudal fins united, the latter terminating in two short threads.

Called by the Natives TONKAH TALAWAREE.

*B.* v. *D.* 223. *P.* 13. *V.* 0. *A.* 112. *C.* 10.

THE *body* linear, lanceolate, sword-form, covered with a thin smooth skin.

The *head* small, short, obtuse, compressed. Mouth wide, no lips; jaws of equal length; a single row of small straight teeth in the fore part of both; behind which, in the under jaw, is a remarkably long, curved, tooth, on each side; there are two similar in form, but much shorter, in the upper jaw. The palate tuberculate. The tongue short, lanceolate, smooth, free. The eyes high, large, roundish. Nostrils double, distant.

Opercula rounded, hardly moveable; branchial membrane exposed. From the posterior, inferior part of the throat, hang two thread-form cirri, above one inch in length.

The *trunk*. The back straight, roundish; the throat carinate; the belly sharp, the tail a little compressed, pointed. No lateral line. The anus very near the head.

The *fins*. The pectoral small, short, lancet-form; the dorsal and anal very long, and both united with the caudal, but in such a manner as to be distinguishable; the pointed caudal fin terminates in two short setaceous cirri.

The *colour* was by some accident omitted in the description.

The *length* one foot two inches.

## No. XL.

GYMNETRUS, *capite cirris longioribus cristato; cirris duobus loco pinnarum ventralium; pinna anali carens.*

The GYMNETRUS, with a crest of long cirri on the head; two cirri in the place of ventral fins; no anal fin.

Called by the Natives

*B.* v. *D.* 320. *P.* 11. *V.* 2. *A.* 0. *C.* 4.

THE *body* lanceolate, sword-form, smooth, without scales.

The *head* very short, much compressed, not broader than the neck; the front declivous, carinate. The vertex crowned with four or five cirri, distinct at the base, and for two inches and a half upward, they then unite, and form a thin, taper, setaceous tail, in all nearly ten inches in length.

The mouth small, oblique, ascending, without lips; the cheeks membranous. The jaws extractile, without teeth, the upper a little longer than the under. The tongue small, sharp pointed, smooth, free. The palate smooth. Eyes large, round, not prominent, the pupil small. Nostrils double, the largest near the orbit, oval.

TONKAH TALAWAREE.

Branchial opercula consist of two flexible, streaked, oblong, plates; the membrane half exposed.

The *trunk*. The back carinate, straight; the sides compressed; the abdomen very short, sub-convex; the under part of the tail rendered somewhat rough, by a series of rough tubercles.

The branchiæ consist of four leaves with one interior row of tubercles. The lateral line descends from the crest, but from two inches behind the pectoral fin, it runs in a straight line to the tail, nearer the belly than the back. The anus near the head.

The *fins*. The first ray of the dorsal, is nearly three inches in length, and resembles the cirri of the crest; the others are setaceous, the longest in the middle of the fin not exceeding an inch; the pectoral very small, ovate; the ventral wanting, unless two cirri of equal length with those of the crest, be taken for fins; the anal are entirely wanting, the caudal (not united with the dorsal,) consists of four rays, connected at the base, by a thin, narrow, membrane, and afterwards joining together, terminate in a very small setaceous thread.

The *colour*, a pale silver; but the silvering comes off in thin pellicles upon handling. The dorsal fin on the edge is darkish.

The *length*, two feet eight inches.

## REMARKS.

This fish, unknown to Linnæus, has been made a new genus by Bloch, characterised by the want of anal fins.

A figure has been given by Ascanius,* under the name Regalicus.

In the Danish Transactions for 1786, it is described Regalicus remipes;† and in the Swedish Transactions, in 1798, under the name Gymnetris Grillii.‡ A species received from Goa, by Bloch, is distinguished, pinna ventrali biradiata.

These definitions differ, in some respects, from one another; and all of them from the present subject.

In 1796 a fish of this genus was cast on shore, in Cornwall; a drawing and description of which were sent to Sir Joseph Banks. It had two ventral cirri; and in the crest of the head resembled the present subject more than any of the others: the tail had been broken off.

The present fish was caught on the outside of the surf at Vizagapatam, in March 1788. The fishermen could give no name to it; declaring they never had seen any like it before.

* Icones Rerum Naturalium, Copenhag. 1772. † Nov. Act. Societ. Hafn. ‡ Act. Acad. Stockholm, Vol. XIX.

# TRICHIURUS.

## GENERIC CHARACTER.

*Caput porrectum; operculis lateralibus; dentes ensiformes, apice semisaggittati: primores majores. Membrana branchiostega radiis* vii. *Corpus compresso-ensiforme. Cauda subulata, aptera.*

The head elongated; the opercula lateral; the teeth ensiform, half bearded at the point;, the fore teeth largest. Seven rays in the branchial membrane. The body compressed, sword-form; the tail awl-form, without fin.

## No. XLI.

TRICHIURUS *capite oblongo, nucha carinata; linea laterali ab ventre ad caudam infima, subcurva; aculei infra caudam loco pinnæ analis.*

The TRICHIURUS, with an oblong head, carinated behind; the lateral line from the anus to its end close to the belly, and a little curve; a row of small prickles along the under part of the tail, in the place of an anal fin.

*Trichiurus Lepturus, Linn. S. N. p.* 429.

Called by the Natives SAWALA.

*B.* vii. *D.* 120. *P.* 11. *V.* 0. *A.* 0. *C.* 0.

THE *body* long, much compressed, thin, without scales, and terminates in a very small, subulate tail.

The *head* oblong, compressed, projecting, sharp, the hind part carinate, the front declivous, depressed. The mouth large, straight, without lips; the under jaw sharp, and considerably longer than the upper. Teeth regularly, but not thick set, dissimilar, the larger curve, long, half bearded; the smaller straight, and sharp: all firmly fixed. The tongue lanceolate, smooth, free. The palate narrow, smooth.

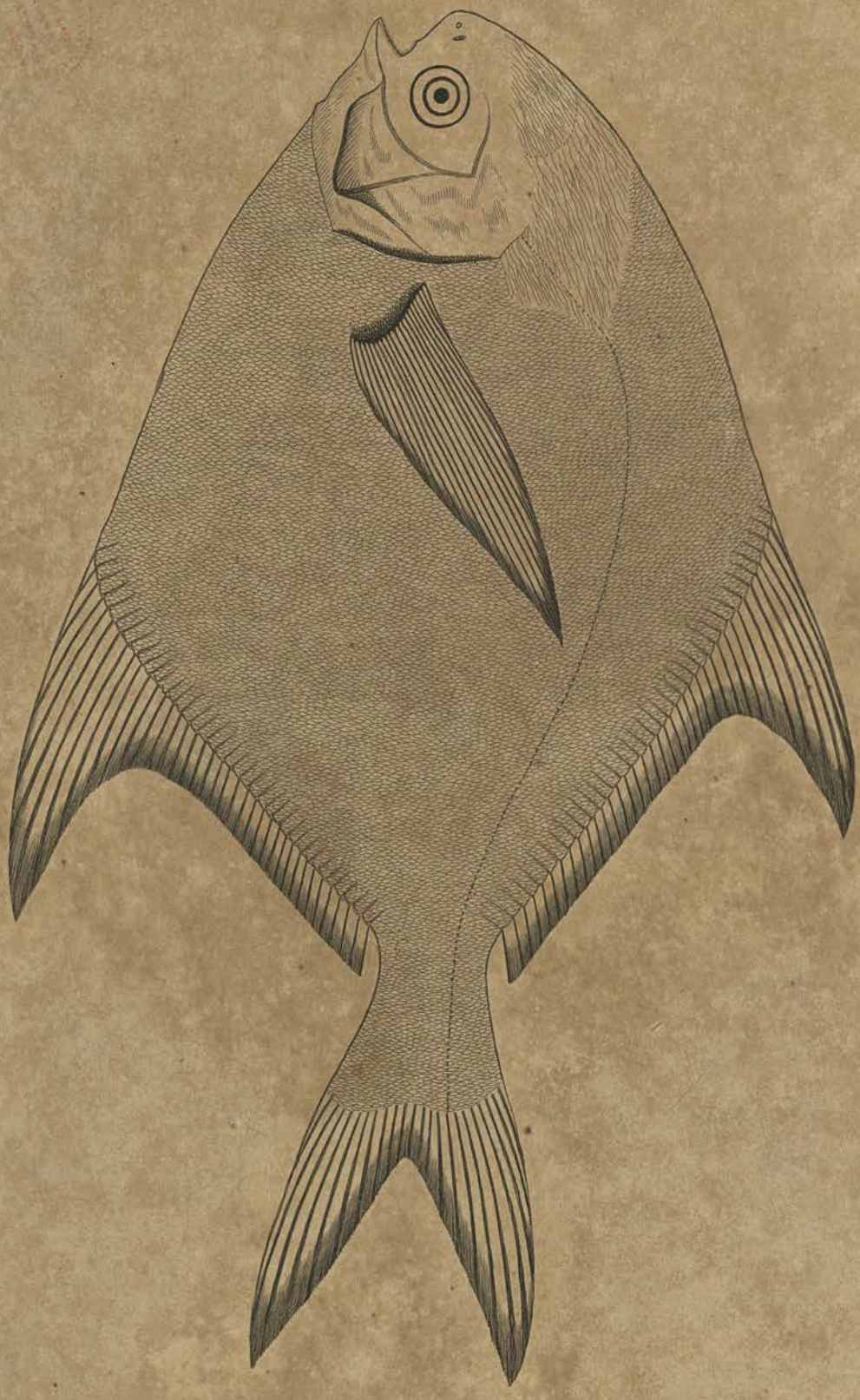
The eyes lateral, high, round, large, much nearer the rostrum than the posterior edge of the opercula. Nostrils solitary, round, near the orbit. Branchial opercula striate, two-leaved, acuminate. Membrane covered; aperture large, lateral and gular.

The *trunk*. The back very narrow, sub-carinate, almost straight; the throat and abdomen hardly convex; the sides plane or compressed; the under part of the tail straight, carinate, set with very small prickles, to near its end, when it becomes extremely slender.

The lateral line, bending from the upper part of the operculum to near the anus, runs afterwards low, and parallel to the curve of the belly and under part of the tail. The anus small, two inches behind the branchial aperture.

The *fins*. The only fins are the dorsal and pectoral; the first rising from the hind head, is continued to within an inch of the point of the tail, it is narrow and nearly of equal breadth, till toward its end: the pectoral is situated low, small, falcate.

SAWALA.



TELLA SANDAWA.

The *colour*. The whole fish shines as if silverized, though the colour is rather a bright lead, than that of pure silver.

The *length* of the subject described, one foot six inches; but they are brought of a much larger size.

REMARKS.

This fish has been described by Artedi, under the name of Lepturus; and by Gronovius, under that of Gymnogaster. It is a very common fish at Vizagapatam, and in much request among the soldiery.

I always conceived it to be the Anguilla indica in Willoughby's appendix; and never saw the other species, (Linn. Ed Gmel. p. 1142) with jaws of equal length; of a brown colour, and spotted.

## STROMATEUS.

GENERIC CHARACTER.

*Caput compressum; dentes in maxillis, palato. Membrana branchiostega*, iv.—vi. *Corpus ovatum, lubricum; cauda bifida.*

The head compressed; teeth in the jaws and palate. The rays of the branchial membrane, iv.—vi. The body ovate, slippery; the tail forked.

### No. XLII.

STROMATEUS *corpore rhombeo, squamoso; pinna dorsi anique falcata; pinnis pectoralibus, lanceolatis.*

The STROMATEUS, with a squamous rhomboidal body; the dorsal and anal fins falcate; the pectoral fins lanceolate.

*Stromateus Argenteus, partibus utrisque pinnæ caudæ æqualibus. Bloch, Pl.* 421.

Called by the Natives TELLA SANDAWA

The white Pomfret of the English.

*B.* iv. *D.* 39. *P.* 21. *V.* 0. *A.* 38. *C.* 22.

THE *body* nearly rhomb-form, much compressed, smooth, covered with small orbicular scales, close, imbricate, tenacious.

The *head* small, much compressed, obtuse, without scales, the front declivous. The mouth under the blunt nose, small, a little oblique; the lips simple. The lower jaw somewhat extractile, the upper immoveable: both short and set with numerous small teeth. Tongue roundish, short, smooth, tied. The palate smooth. The eyes middle, near the rostrum, orbicular, moderate size. Nostrils near the edge of the rostrum, double, the posterior (which is the biggest) oval, the anterior round.

The branchial opercula, smooth, ciliate at the edge, bridled so as hardly to be moveable, or to admit seeing the membrane.

The *trunk*. The back assurgent, carinate, and on the ridge, before the dorsal fin, five or six spiculi under the skin, may be felt by the finger; the throat and abdomen declivous, ridged, the sides and tail compressed, the former a little convex: five spiculi between the anus and the anal fin, rather more perceptible than those on the back, are found just piercing the skin.

The lateral line rising from the upper edge of the opercula, forms an arch over the pectoral fin to the end of the dorsal, and is then continued straight along the upper part of the tail: another line but less conspicuous rising with the first, runs straight to the middle of the caudal fin. The anus small, considerably nearer the head than the tail.

The *fins*. The dorsal rising from the highest point of the back, consists at first of eleven or twelve longer rays, disposed in somewhat of a crescent-form, and then becoming narrow and equal, is continued along the declivity, to where the tail grows narrowest. The anal of the same length, rises opposite to the dorsal; the pectoral nearer the belly than the back, long, sharp, lanceolate, or acuminate in the middle; the caudal fin deeply forked.

The *colour*. The back dark, with a bluish or purplish cast; the rest a silver gray; the dorsal and caudal fins a little lighter than the back. The anal has a very pale yellowish cast.

| | Inches. | Lines. |
|---|---|---|
| The *length*, from the nose to the caudal fin - - - - - - - | 9 | 5 |
| Greatest breadth - - - - - - - - - - - - - | 6 | 0 |
| Length of the caudal fin - - - - - - - - - - - | 2 | 5 |

## No. XLIII.

STROMATEUS *corpore ovato, squamoso; pinnis pectoralibus falcatis.*

The STROMATEUS, with a squamous, ovate, body; and falcate pectoral fins.

*Stromateus niger maxillis æqualibus. Bloch, Pl.* 422.

Called by the Natives NALA SANDAWAH.

Black Pomfret of the English.

*B.* vi. *D.* 45. *P.* 19. *V.* 0. *A.* 39. *C.* 22.

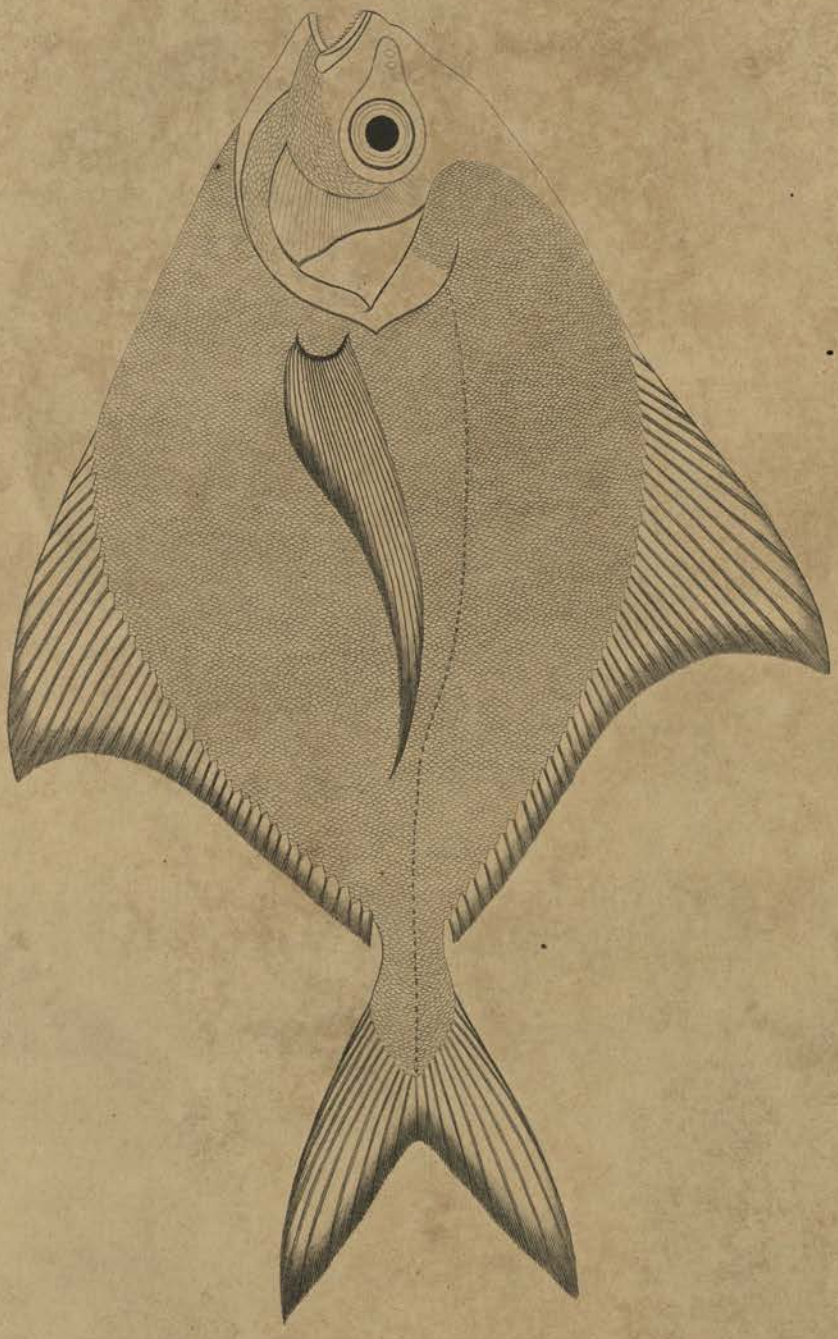
THE *body* ovate, much compressed; scales oblong, roundish, close, smooth, tenacious.

The *head* much compressed, as in the former fish, but the nose less blunt, or round; the lower part of the face covered with scales. The mouth small, and capable of more extension; both jaws being in some degree extractile, and the rostrum not projecting as in the former. The teeth numerous, but larger; the eyes proportionally larger also and more distant from the rostrum; nostrils as in the former.

The opercula ciliated as in the former, but rounder: in some parts covered with scales, and not being tied down behind, leave the membrane visibly exposed.

The *trunk*. The back arched, carinate; the throat, belly, and tail, also carinate, but the latter, where the dorsal and anal fins terminate, becomes very small and round; the sides hardly convex. The two exterior branchiæ are pectinate and tuberculous, the interior tuberculous only. The lateral line gently curve, but from the end of the pectoral fin runs straight along the middle of the tail; and is there carinate: there is no appearance of a second line. The spines before the fins, in the former fish, are here wanting; and the anus is placed still nearer the head, on a line with the pectoral fin.

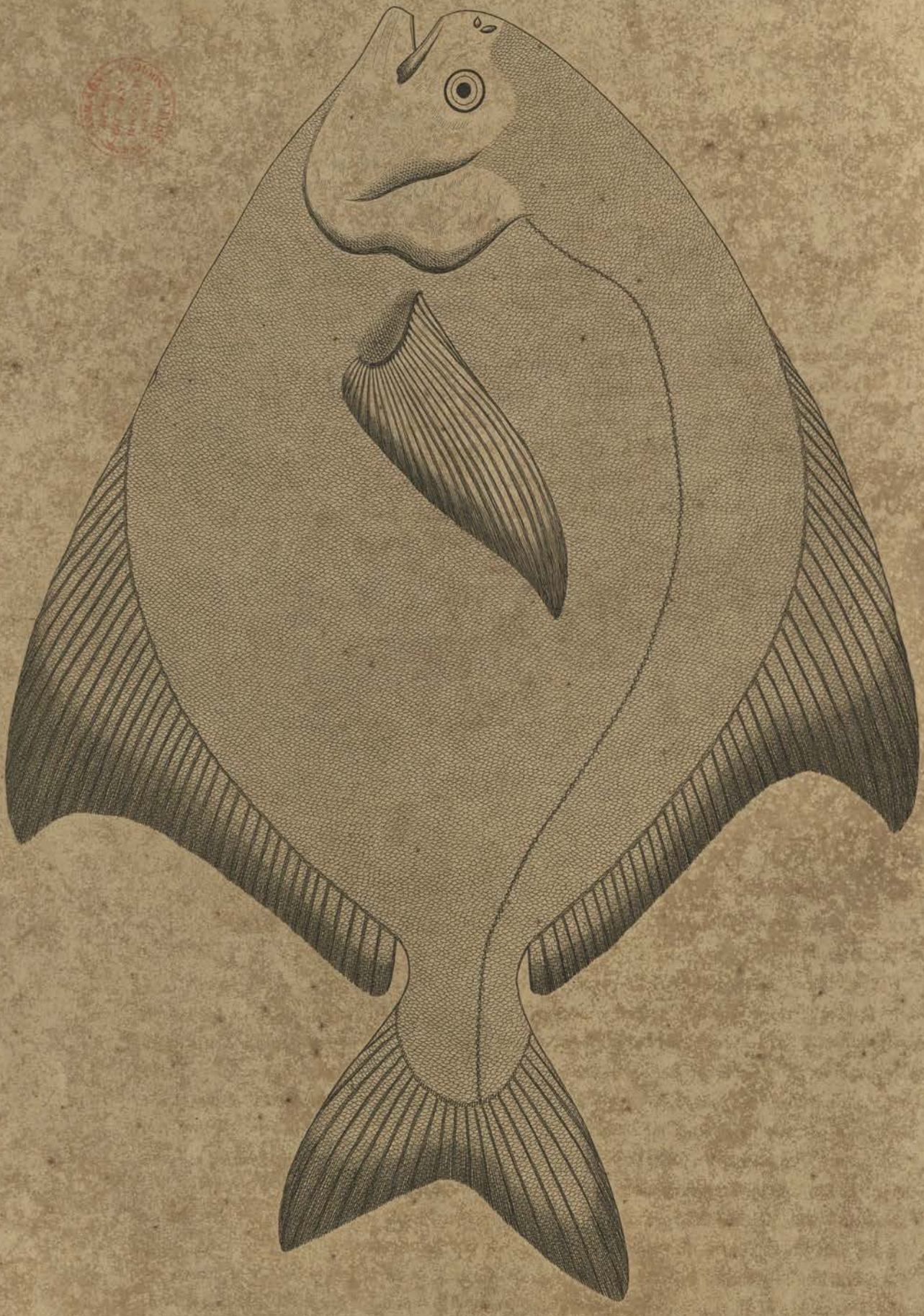
The *fins*. The dorsal and anal resemble those of the former fish, in their situation, but have less of the



LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

NALLA SANDAWAH.

R.



ATOO KOIA.

crescent-form; the pectoral are long and falcate; there are no ventral fins; the caudal forked, though not so deeply as in the white Pomfret.

The *colour* universally dark, tending to black, except the throat and belly, which are some shades lighter. The skin, as also the membranes of the fins are remarkably thick.

The *length* from the nose to the caudal fin, seven inches; the greatest breadth, four.

### REMARKS.

The white and the black Pomfrets, are esteemed two of the most delicious fishes on the Coromandel coast; but they must be eat when fresh caught, as they are injured greatly by being kept only a few hours. The black, though a less firm fish, is by some preferred to the white.

In the latter fortnight of March, and during part of April, Pomfrets were in most plenty at Vizagapatam. It was remarkable that they were never caught in abundance for more than two or three days successively; after which they, in a manner, disappeared for a like number of days, and again returned.

The Pomfrets which I saw at Madras, agreed exactly with the descriptions given above; but there are other species on that part of the coast, of which notice shall be taken hereafter.

The figure of one species of this genus has been given by Sir Hans Sloane in his history of Jamaica,* where it is known under the name Pampus, or Pampel, whence probably the name Pomfret among the English in the East Indies: sometimes pronounced Pomplet, or Pomflet.

## No. XLIV.

STROMATEUS *corpore sub-orbiculato, squamoso; maxillis obtusis sub-æqualibus.*

The STROMATEUS, with a body nearly orbicular, covered with small scales; the maxillæ obtuse, and nearly of equal length.

Called by the Natives ATOO KOIA.

*B.* *D.* 44. *P.* 24. *V.* 0. *A.* 40. *C.* 22.

THE *body* nearly orbicular, much compressed, scaly; the scales small, round, close, less tenacious than in the other species.

The *head* round, compressed, short, the rostrum obtuse, like that of the white Pomfret, and the crown and part of the front squamous. The mouth small, capable of little extension; the jaws short, nearly of equal length, hardly extractile, the under one only moveable and obtuse; the teeth are unlike those in the other species: the upper jaw is rough to the finger like a file, the under is a bone distinctly pectinate. The tongue roundish, thick, smooth, bridled; the palate also smooth. The eyes small, round, not protuberant. Nostrils double, close to the nose, the posterior large, oval; the anterior smaller, round.

The opercula can scarcely be called two-leaved; they are not so pointed as in the white Pomfret, and more confined, while the branchial aperture is so small that the membrane is completely hidden.

The *trunk.* The back and belly arched, carinate; the sides compressed; the tail grows narrow where the dorsal and anal fins end, but again expands to receive its own fin. There are no spiculi on the back or belly.

The lateral line conspicuous, supreme, carinate, arched; but towards the end straight, and terminates not exactly at the middle of the caudal fin. There is no second line. The anus much nearer the head than the tail.

The *fins.* The dorsal and anal are placed more forward than in the white Pomfret; they are nearly alike in

* Vol. II. Tab. 250, Fig. IV.

shape, and terminate opposite to each other, at the narrowest part of the tail; the first rays in both, are shorter, and rise more gradually to form the crescent; the caudal is less deeply divided, the lobes nearly of equal length: but all the three fins are more remarkably distinguished, by being squamous almost to the margin of the membrane. The pectoral broad, descending, the point a little curve. No ventral fins.

*Colour.* The whole fish is of a cineritious colour, the belly only being somewhat lighter, and here and there marked with very minute black dots.

| | Inches. | Lines. |
|---|---|---|
| The *length*, from the nose to the middle of the anal fin, - - - | 11 | 6 |
| Breadth of the body - - - - - - - - - - - - - - - - - | 7 | 0 |

REMARKS.

This species is very rare. I first saw it in May 1788, and it was very seldom brought afterwards. In quality for the table it is very inferior to the white or black Pomfret. Though alike in colour, this fish is very different from the Stromateus Cinereus of Bloch; which is specifically characterized, by the length of the lower lobe of the caudal fin.

## No. XLV.

STROMATEUS *corpore rhombeo, alepidoto; aculeis bicuspidatis ante pinnam dorsalem analemque; cauda lunata lobo inferiore longissimo.*

The STROMATEUS, with a rhomb-form body, without scales; double headed spines before the dorsal and the anal fin; the inferior lobe of the lunated caudal fin very long.

Called by the Natives SUDI SANDAWAH.

*B.* iv. *D.* $\frac{7}{7}$. $\frac{1}{39}$. *P.* 22. *V.* 0. *A.* $\frac{5}{5}$. $\frac{1}{40}$. *C.* 24.

THE *body* rhomb-form, thin, compressed, without scales, the skin soft, marked with various lines or striæ.

The *head* small, compressed, short, obtuse. The mouth under the projecting blunt nose, small, narrow, the jaws have little motion, the under shortest: neither have teeth, nor are there teeth in the palate. The tongue round, blunt.

The eyes middle, large, not prominent. Nostrils between the orbit and nose, one before the other, the posterior largest, oval; the other round.

The hinder lamina of the operculum acuminate; the branchial membrane visible, though partly covered.

The *trunk.* The back assurgent and carinate; on the hind head are two latent spines; and on the ascent before the dorsal fin, are seven distinct, visible, spiculi, with double points. Another latent spine is felt on the breast, and five spiculi like those on the back, are visible before the anal fin. The sides and tail as in the other species. The lateral line is arched, exactly as in the white Pomfret; but a second line equally conspicuous, rising from the same place, runs straight to the tail. The anus near the head.

The *fins.* The dorsal and anal fins in situation and form resemble those of the white Pomfret, but each has a recumbent spine in front, pointing forward, and the anterior crescent portion of the anal terminates in a long setaceous tail. The caudal is lunate, and its inferior lobe, four inches one-fourth in length, terminates in the same manner as that of the anal; the pectoral, long, acuminate; no ventral fins.

The *colour* of the back, and dorsal fin, leaden, the belly silvery; the anal and caudal fins yellow.

SUDI SANDAWAH.

| | Inches. | Lines. |
|---|---|---|
| The *length*, from the nose to the caudal fin, - - - | 4 | 0 |
| Greatest breadth - - - - - - - - - - - - | 3 | 0 |

## REMARKS.

The two last fish seem hitherto to have been undescribed. The former, as before remarked, differs much from the Stromateus Cinereus of Bloch.* The latter agreeing with the Stromateus Argenteus of China,† in the double-headed spines before the dorsal and anal fins, is distinguished by the want of scales, and by the shape of the anal and caudal fins.

The species therefore of this genus found on the coast of Coromandel, are the following.

1. Stromateus striis carens of Bloch, sent from Tranquebar by Dr. Kœnig, and which appears to be distinct from the Stromateus Paru of Linnæus.‡
2. Stromateus Cinereus.§
3. Stromateus Argenteus, No. XLII.
4. Stromateus Niger, No. XLIII.
5. Stromateus Atoo Koia, No. XLIV.
6. Stromateus Sudi Sandawah, No. XLV.
7. Stromateus Sadei Waval, mentioned by the Danish missionary, the Rev. Mr. John, but not described ; and may possibly be the same with No. XLV.‖

The two species of China, viz.

Stromateus Argenteus.

Stromateus Chinensis,¶ are distinct from any of the above. As to the Stromateus Cumarca,** it remains doubtful whether distinct or not, from the Paru of Linneus.

* Bloch, Pl. 420. † Act. Acad. Stockholm, Tom. IX. Tab. 9. ‡ Bloch, Pl. 160. § Pl. 420.
‖ Ib. Tom. IV. p. 81. ¶ Act. Acad. Stockholm. ** Linn. ed Gmel. p. 1148.

# PISCES JUGULARES.

FISHES WHOSE VENTRAL FINS ARE PLACED MORE FORWARD THAN THE PECTORAL FINS, OR UNDER THE THROAT.

## CALLIONYMUS.

GENERIC CHARACTER.

*Caput labio superiore duplicato. Oculi approximati. Membrana branchiostega* vi. *Apertura nuchæ foraminibus respirante. Opercula clausa. Corpus nudum; pinnæ ventrales remotissimæ.*

The upper lip doubled; eyes near each other. The branchial membrane with vi. rays; the opercula closed, spiracula at the hind head. Body without scales; the ventral fins distant from the head.

## No. XLVI.

CALLIONYMUS *capite scabro, alepidoto; linea laterali carinata; cauda integra varia striata.*

The CALLIONYMUS with a rough scaleless head; a carinated lateral line; an undivided tail, streaked with different colours.

*Callionymus indicus, Linn. S. N. p.* 434.

*Platycephalus Spathula. Bloch, Pl.* 423.

Called by the Natives IRRWA.

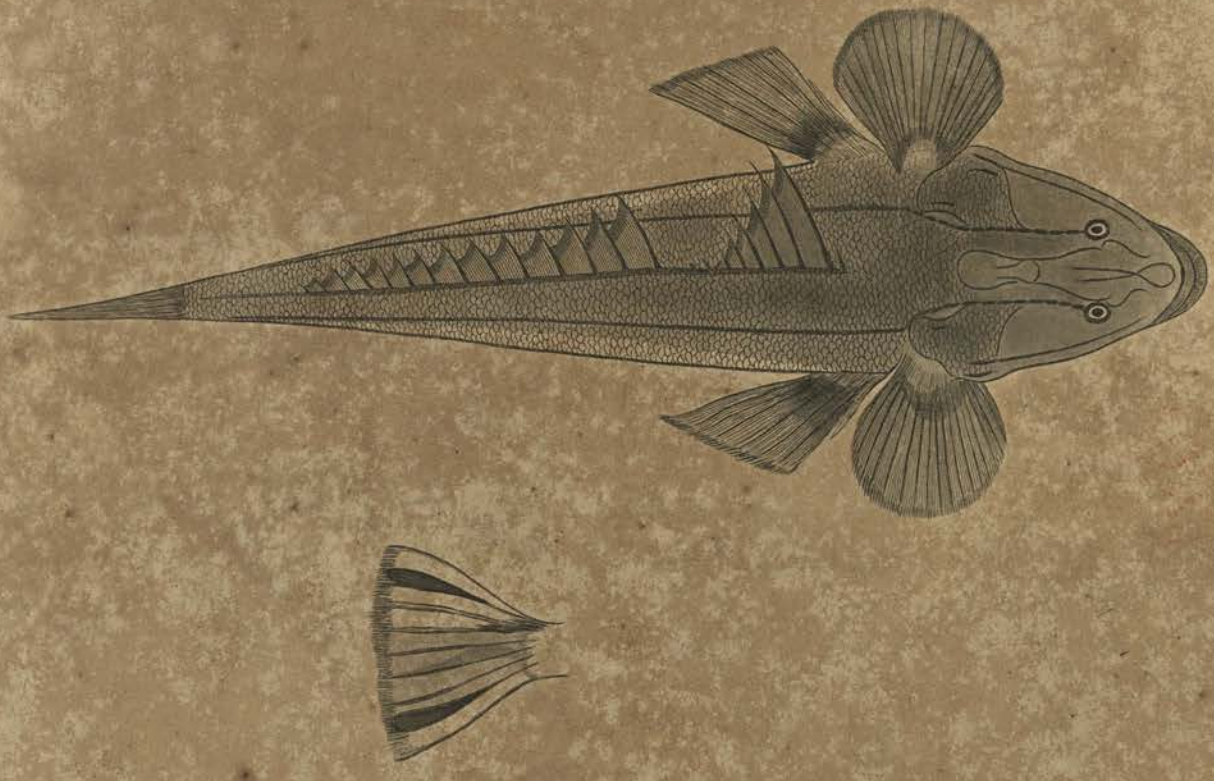
*B.* vii. *D.* $\frac{9}{9}$. 13. *P.* 19. *V.* $\frac{1}{6}$. *A.* 11. *C.* 16.

THE *body* wedge-form, very small towards the tail; squamous, rough, scales very small, orbicular, ciliate.

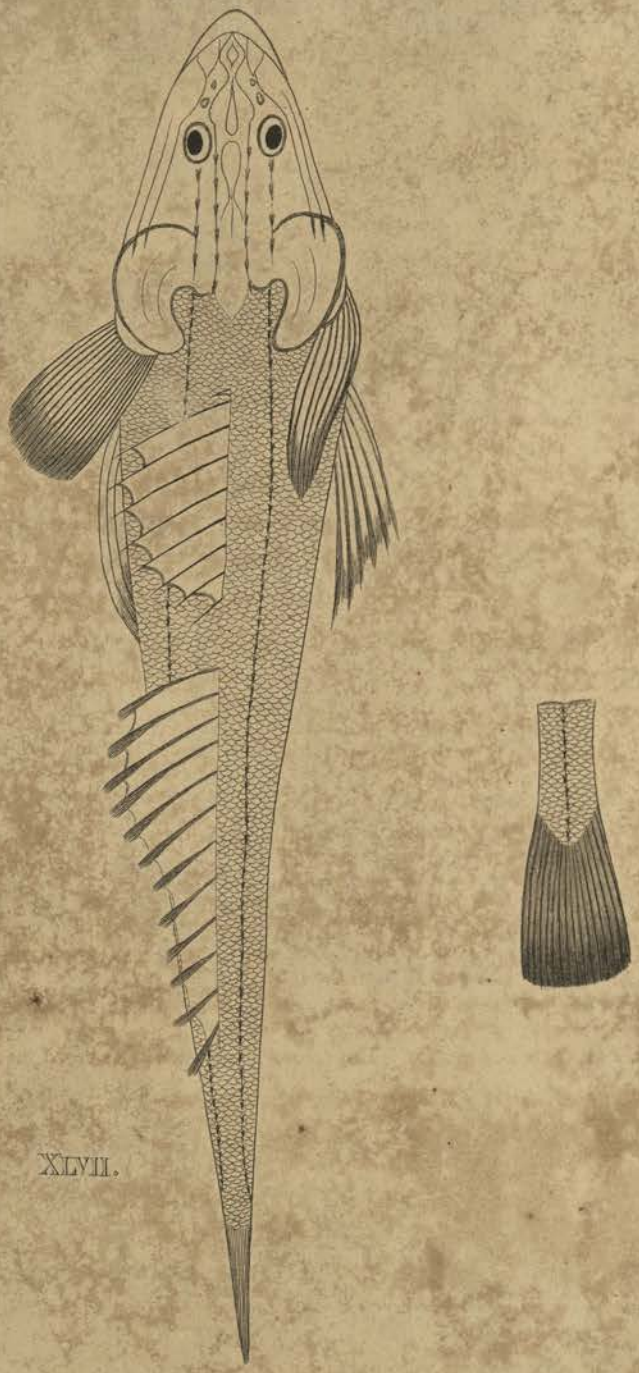
The *head* broader than the body, long, wedge-form, depressed, without scales; but rough, and a line of small prickles behind each eye. The mouth terminal, large; the under jaw considerably longer than the upper: both set with numerous minute, linear, sharp teeth, in many close ranks. The tongue thin, hard, smooth, resembling in figure and colour, the flint of a small pistol. The palate tuberculous, and set with teeth. The eyes vertical, small, oval, near the nose, separated by a groove or furrow. The nostrils double, very small.

The opercula squamous, armed on each side with two hard, lanceolate, spines, and a softer spine near the point of the posterior lamina. The branchial membrane half exposed, has seven thick ossicles.

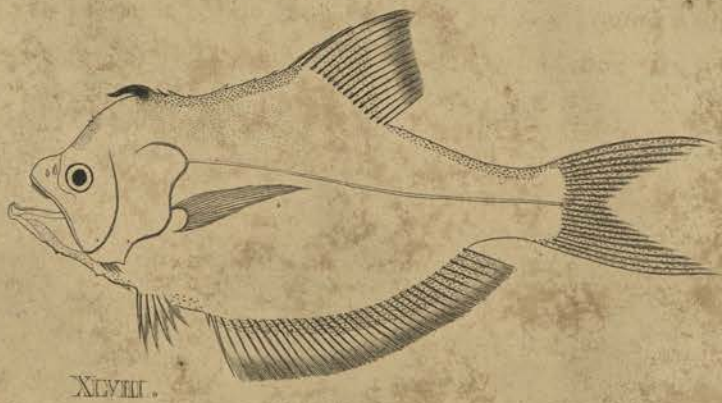
The *trunk* wedge-form, depressed; the back straight; the belly protuberant but flattish; the sides hardly convex; the tail very taper. The lateral line straight, supreme, carinate, rough. The anus nearly middle.



IRRWA.



XLVII.



XLVIII.

IRRWA.

SOMDRUM KARA MOODDEE.

The *fins*. Two dorsal in a groove in the middle of the back; the first scapular consisting of soft spinous rays, of which the first and three last are very short; the second lumbar, declining; the pectoral are very low, orbicular; the ventral distant from each other, rather behind the pectoral; the anal declivous, exactly opposite to the second dorsal; the caudal distant, equal, or truncate.

The *colour* of the upper part darkish, with a faint mixture of yellow; below the line the colour brightens to white. The dorsal, pectoral, and ventral fins are variegated with black lines; the anal are light-coloured; the caudal remarkably striped, black, white, and yellow.

The *length* of the subject described nine inches; but they are sometimes found double that size.

## No. XLVII.

CALLIONYMUS *capite sulcato, spinis munito; linea laterali aculeata.*

The CALLIONYMUS, with a furrowed head, armed with spines; the lateral line prickly.

Called also by the Natives, IRRWA.

*B.* vii. *D.* $\frac{9}{9}$. 12. *P.* 18. *V.* $\frac{1}{6}$. *A.* 12. *C.* 16.

THIS fish agreeing in its form, as well as in most other material points, was found on a comparison of subjects of the same size, to differ in the following circumstances.

The crown of the head less depressed, more rough and prickly; the opercula not squamous; each was armed with three spines; and two rows of prickles passed from the nostrils to the hind head between the orbits. The eyes were larger.

The lateral line more highly carinate and prickly. The second dorsal fin fibrous; all the fins of a darker colour, and the caudal had not the coloured streaks remarkable in the former fish.

### REMARKS.

The position of the ventral fins should certainly exclude these two last described from the order of Jugular fishes; and Bloch has made a distinction: but in Gmelin's Linnæus, they still retain their place.

## No. XLVIII.

BLENNIUS? *dorso gibbo; aculeo curvo, vaginato, cristam referente, dorso anteriore; pinnæ ventrales pentadactylæ, molles; cauda bifurca.*

The BLENNIUS? with a hump; a curve, sheathed spine, on the anterior part of the back, resembling a crest; a ventral fin of five soft rays; the tail forked.

Called at Vizagapatam, SOMDRUM KARA MOODDEE, at Madras KAKASE.

*B.* vii. *D.* $\frac{7}{7}$. $\frac{2}{17}$. *P.* 18. *V.* 5. *A.* $\frac{2}{34}$. *C.* 22.

THE *body* somewhat ovate, but with a protuberance in the back; much compressed, without scales, smooth, pellucid.

The *head* small, compressed, without scales; front declivous, carinate; rostrum short, truncate. Mouth middle, a little oblique, wide; no lips, cheeks membranous. Jaws extractile; the under moves freely, and has

a small protuberance at the point, adapted to a cavity for its reception in the upper. Teeth setaceous, numerous. Tongue short, awl-form, white; eyes in deep orbits, small, orbicular. Nostrils double, in the middle between the orbit and rostrum.

Opercula consists of two laminæ, sub-membranous, with four prickles on the edge of the second. The branchial membrane half exposed, the aperture arched.

The *trunk*. The back, gradually assurgent from the vertex, forms a hump in the middle; on the declivity of which, towards the tail, is situated the dorsal fin; the sides much compressed, the belly carinate, the breast prickly.

Branchiæ four-leaved, the exterior pectinate on the inside, with very long teeth. Lateral line very slightly curve, high, smooth, faint. The anus near the breast.

The *fins*. On the ridge of the back before the dorsal, there are seven small prickles, equidistant from each other, unconnected, three pointing forward, three backward, the seventh, and anterior, is the longest, appearing like a crest, in the shape of the elephant's trunk. It is covered with a black coloured skin, above which appears its curve point, but the direction of the crest is forward. On the concave side, it is connected by a very loose membrane. Lower towards the rostrum are two other prickles, erect and very minute.

The dorsal fin has one spinous ray, the next ramous, is an inch long, the last ray four lines; the pectoral middle, lanceolate, short; the ventral rays resemble fingers, they cover the anus, and are placed a little more forward than the pectoral fins. The long anal fin mounts towards the tail in an arch, but the rays are nearly equal; the caudal forked, the lobes sub-falcate.

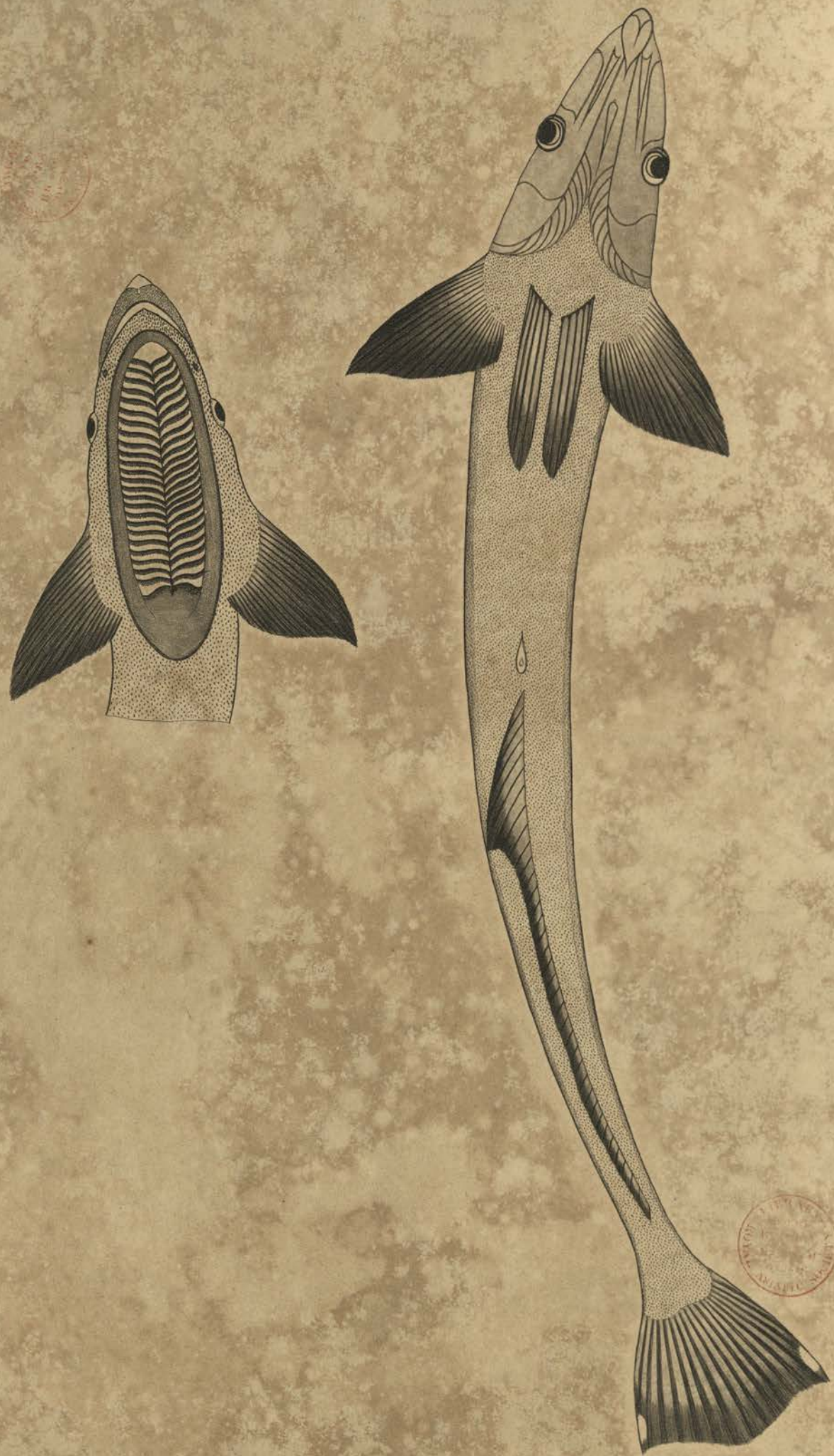
The *colour* of this fish, when alive, is changeable, faint red, blue, and green, on a golden ground; that is, on the upper part of the head and back; the rest a glossy white. All the fins are whitish, but powdered with minute dark points, as are also the shoulders.

The subject described, was five inches in length, and I did not meet with any larger.

## REMARKS.

This fish, though the position of its ventral fins is scarcely more forward than the pectoral, and their rays five in number, has been placed here; but under strong doubt of its belonging to the genus. The hump on the back, raised a suspicion of its being allied to the new genus Kurtus,* of which only one species (sent from the Coromandel coast, by the late Dr. Koenig) is hitherto known. But there are strong objections to such a conjecture.

* Bloch, Pl. 169.



ALA MOTTAH.

# PISCES THORACICI.

FISHES WHOSE VENTRAL FINS ARE PLACED IMMEDIATELY UNDER THE PECTORAL FINS, OR ON THE BREAST.

## ECHENEIS.

GENERIC CHARACTER.

*Caput pingue nudum, depressum; supra planum, marginatum, transverse sulcato-serratum. Membrana branchiostega radiis* x. *Corpus nudum.*

The head oily, without scales, depressed; flat above, marginated, and furrowed transversely with serrated ridges; ten rays in the branchial membrane; the body without scales.

## No. XLIX.

ECHENEIS *striis capitis viginti quinque, linea elevata in duas partes secundum longitudinem divisis; cauda integra.*

The ECHENEIS, with twenty-five transverse striæ on the head divided, down the middle by a longitudinal raised line; the tail undivided.

*Echeneis Neucrates, Linn. S. N. p.* 446.

Called by the Natives, ALA MOTTAH.

*B.* x. *D.* 37. *P.* 21. *V.* 6. *A.* 37. *C.* 16.

THE *body* long, roundish, taper, without scales; the skin coriaceous, and somewhat rough, when stroaked upwards.

The *head* oblong-ovate, broader than the body, flat above, and furnished with a long oval shield, extending beyond the hind head, with twenty-five oblique, transverse, curve, rough ridges, divided equally in the middle, by a longitudinal ridge. It is by means of this apparatus, that the fish adheres firmly to living as well as to inanimate subjects.

The mouth small, transverse; the under jaw pointed, and considerably longer than the upper; both feel like a file, being set thick with minute, sharp, teeth. Tongue small, round, smooth, free. Palate rough. The eyes high, orbicular. Nostrils double, small. Opercula gular, oblong, imperfectly divided; most part of the branchial membrane exposed.

The *trunk*. The back and sides convex; the belly flattish; the tail small, round. The lateral line conspicuous; at first a little curve, afterwards middle, and straight. The anus middle and gaping.

The *fins*. The dorsal and anal opposite, alike in form, and of the same length; they are broadest at the

beginning, but from the fifth ray, gradually decline; the pectoral broad, acuminate above; the ventral long, sword-form, near each other; the caudal long, entire, the middle rays a little longer than the rest, forming a blunt, or rounded point.

The *colour* of both body and fins, nearly black; the belly of a darkish lead colour. An oblong white spot on each corner of the caudal fin.

The *length*, of the subject described, including the caudal fin, one foot four inches.

REMARKS.

I have met with this fish at sea, of a lighter colour, and much larger size. They were found fixed on the bodies of sharks, which had been caught by hooks, and were with difficulty separated. I do not recollect seeing more than one on the same shark.

---

## GOBIUS.

GENERIC CHARACTER.

| | |
|---|---|
| *Caput poris duobus inter oculos approximatos: altero anteriore. Membrana branchiostega radiis* iv.*; pinnæ ventrales unitæ in ovatam.* | The eyes near each other; and two pores between them, one before the other. The branchial membrane consists of four ossicles; the ventral fins united in an oval form. |

### No. L.

GOBIUS *corpore maculis magnis, nigrescentibus; pinnis pectoralibus lanceolatis; cauda lata-ovata, acuminata.*

The GOBIUS, with large blackish spots; lanceolate pectoral fins; the tail broad ovate, with a narrow point.

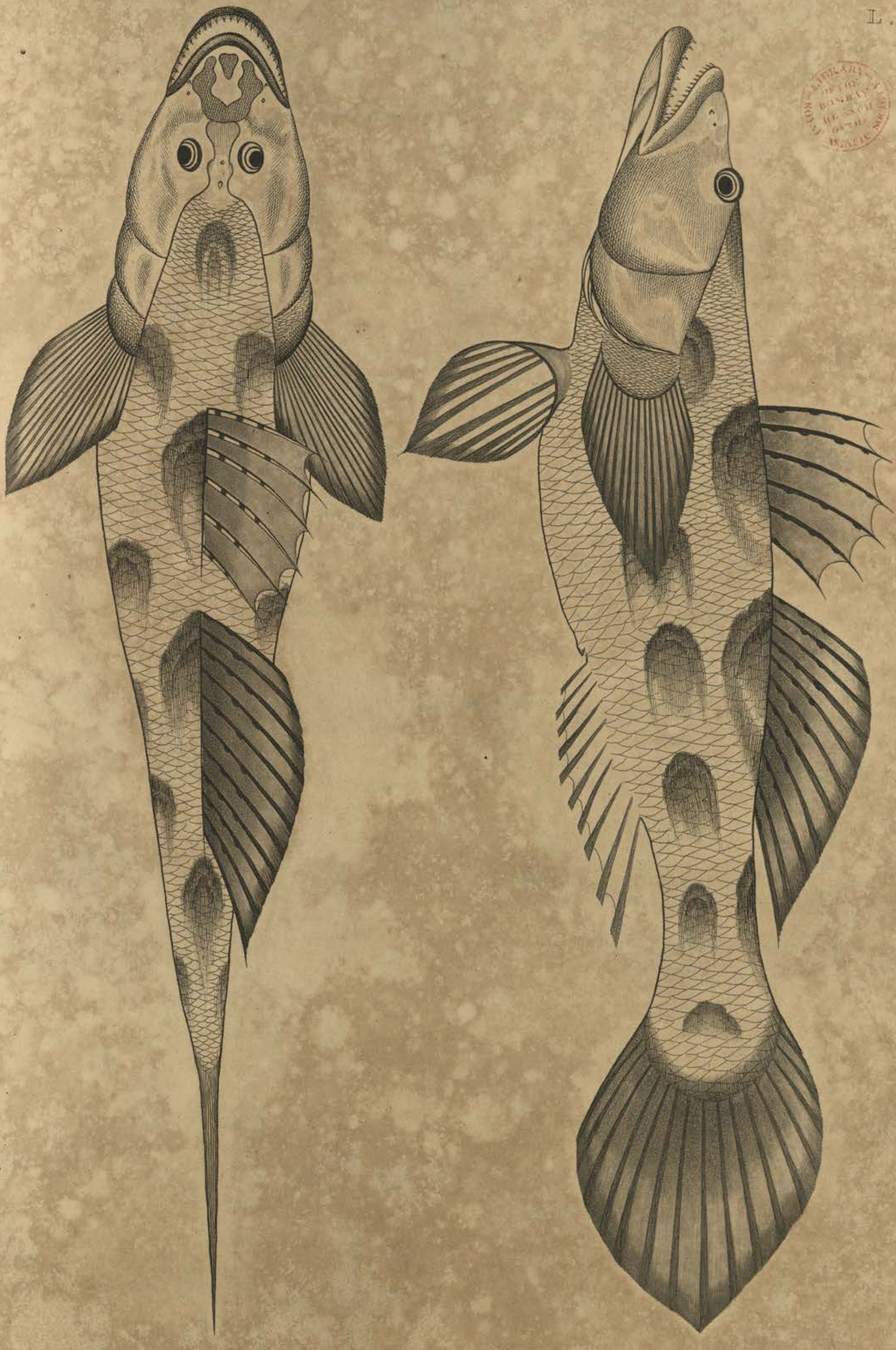
*Gobius Lagocephalus. Pall. Spic. Zool.* 8. *p.* 14. *Tab.* 2. *Fig.* 6. 7. *Linn. ed. Gmel. p.* 1202.

Called by the Natives KORAH MOTTA.

*B.* v. *D.* 6. 11. *P.* 18. *V.* 10. *A.* 10. *C.* 18.

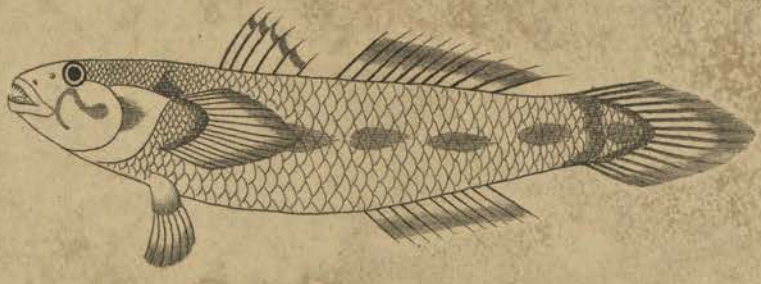
THE *body* oblong, roundish, compressed, squamous; the scales large, rounded, base truncate, imbricate, loose.

The *head* large, elongated, depressed above, compressed on the sides, without scales. The mouth large, terminal; the lips thick. The lower jaw longer than the upper; teeth numerous, dissimilar, the larger reflex, the smaller straight. The tongue large, obverse, heart-form, sub-bifid at the base, smooth, pellucid, free. The palate smooth. The eyes high, nearly vertical, orbicular, prominent. The nostrils near the rostrum, very small, double. Two pores between the eyes.



KORAH MOTTA.

KOKU.



NUNA MOTTA.

Branchial opercula without scales, the anterior lamina covered with a fleshy muscle, the posterior shaped like a quadrant. The branchial membrane half discovered, the two inferior rays much curved; the aperture rather small.

The *trunk*. The back straight, round, the side convex; the throat flat, the belly prominent; the tail round, compressed. No lateral line to be distinguished. The anus middle, between the head and the tail.

The *fins*. Two dorsal, the first scapular, of six rays with the soft points rising above the membrane; the second lumbar, of eleven declining ramentaceous rays; the pectoral broad and pointed. The ventral united in the manner peculiar to this genus. The anal has ten assurgent rays, shorter than those of the second dorsal. The caudal fin is ovate, with a small point.

The *colour* a dull yellow, variegated on the sides, with large dark spots; the belly white. The rays of the dorsal and pectoral fins dotted with black; the other fins of a darker yellow than the body, but without dots.

In a smaller subject some dots were found on the pectoral and caudal fins.

Length from the nose to the caudal fin, one foot.

Length of the longest ray of the caudal fin, two inches and a half.

## No. LI.

GOBIUS *maculis ovalibus; pinna anali radiis octo; cauda sub-rotunda, fasciata.*

The GOBIUS with oval spots; an anal fin of eight rays; the tail roundish, and streaked transversely.

Called by the Natives KOKU.

*B.* v. *D.* 6. 10. *P.* 17. *V.* 10. *A.* 8. *C.* 16.

THIS species was never found to exceed eight inches in length. The head and back were of a very dark green, sprinkled with black dots. The belly whitish. The dorsal fins spotted with brown; the ventral and anal were of a light colour, the former with a faint yellowish cast, the latter a reddish; the caudal marked with transverse lines of dusky brown.—On the lateral line, on each side, were five oblong-oval, black spots.

## No. LII.

GOBIUS *maculis rhombeis; pinnis pectoralibus caudaque cuspidatis.*

The GOBIUS with lozenge-shape spots; the pectoral and caudal fins cuspated.

Called by the Natives NUNA MOTTA.

*B.* iv. *D.* 6. 11. *P.* 17. *V.* 10 *A.* 11. *C.* 16.

THIS species, including the tail, generally measured five inches. Its colour pale brown, with a few azure dots scattered on the sides; the belly whitish. Five black marks were observed on the lateral line, as in the last species, but of a lozenge-shape; the form of the caudal fin was very different, and the fins were not spotted.

## No. LIII.

GOBIUS *macula nigra in pinnâ dorsi anteriore; cauda oblonga, rotundata, fasciata.*

The GOBIUS with a black spot on the first dorsal fin; an oblong, rounded tail, streaked transversely.

Called by the Natives BULLEE KOKAH, (or MOTTAH.)

*B.* iv. *D.* 6. 11. *P.* 18. *V.* 10. *A.* 9. *C.* 16.

THIS species agreeing in general with the former, in its generical characters, differs somewhat in the form of the body; the back is more convex and the tail near the end becomes almost quite round. The tongue, of the usual shape, resembles a piece of firm, clear jelly.

The *colour* of the whole, except the belly, dark brown, the sides marked with three or four dusky longitudinal lines, and a few spots of a colour still darker. The rays of the dorsal and anal fins are also spotted; and on the first dorsal is a remarkable round, black mark; the caudal is streaked transversely, as in No. LI. but the fin differs in shape.

## No. LIV.

GOBIUS *corpore punctulis cæruliis; pinna prima dorsi radiis quinque longioribus, in setam junctis; cauda obliqua, obtusa.*

The GOBIUS with small cerulean dots over the whole body; the first dorsal fin of five long rays uniting into a setaceous thread; the tail oblique, obtuse.

Called by the Natives NETTEE KUNLA MOTTAH.

*B.* v. *D.* 5. 25. *P.* 17. *V.* 10. *A.* 24. *C.* 16.

THIS beautiful species has the ventral fins united, and other characters of the genus.

The *body* of an olive colour, has seven dark oblique streaks on each side, and is every where powdered with azure dots; the dorsal and caudal fins are dotted in like manner. The rays of the first dorsal setaceous, and remarkably long; the membrane of a dark green, being decorated with a large purplish mark besides the azure dots, makes, when fully spread, a very showy appearance.

The caudal fin is of an uncommon form. The inside of the mouth of a deep purple colour. The length five inches.

It was found among some rocks which had been covered by the surf.

LIV

LIII

LIII. BULLEE KOKAH.

LIV. NETTEE KUNLA MOTTAH.

## No. LV.

GOBIUS *varius; iride aurea; radio tertio quartoque pinnæ dorsi longiore, setaceo; cauda integra, parum acuminata.*

The variegated GOBIUS. The iris of the eye golden; the third and the fourth ray of the dorsal fin long and setaceous; the tail entire, somewhat pointed.

Called by the Natives PEEL MOTTAH.

*B.* iv. *D.* 6. 11. *P.* 17. *V.* 10. *A.* 12. *C.*

THIS species, different from any of the former, was found also among some rocks; but neither drawn, nor fully described. It was three inches long; the back of a faint green with dark spots; about the throat and opercula the colours changeable. Iris golden. The tongue remarkably distinguished by six studs, placed transversely in pairs, which looked as if gilded; and emitted a light in the dark, resembling that of the glow worm, visible after death, but most splendent when the fish was alive. The third and fourth rays of the first dorsal fin, long and setaceous. The tail a little pointed.

# SCORPÆNA.

## GENERIC CHARACTER.

*Caput magnum aculeatum; oculi vicini. Dentes maxillis, palato, faucibusque. Membrana branchiostega. radiis* vii.

The head large, prickly; eyes near to each other; teeth in the jaws, palate, and throat. The branchial membrane has vii. rays.

## No. LVI.

SCORPÆNA *capite cavernoso, alepidoto, spinis munito; cirrulis pluribus ad maxillam inferiorem; oculis magnis; cirrus inter nares utrinque; cauda oblonga, rotundata.*

The SCORPÆNA with a rough, pitted, head, without scales, but armed with spines; several cirri at the lower jaw, and one between the nostrils.

Called by the Natives MOOROO BONTOO.

*B.* vii. *D.* $\frac{12}{22}$. *P.* 18. *V.* $\frac{1}{6}$. *A.* $\frac{3}{8}$. *C.* 16.

THE *body* oblong-ovate, compressed, squamous. Scales imbricate, small, roundish, with pectinated margins, and feeling rough to the finger.

The *head* roundish, obtuse, rough, with many straight spines pointing backwards; the front concave declivous. The mouth very wide, a little oblique, terminal. The jaws extractile, nearly equal in length, the upper emarginate; six or seven cirri at the under jaw. Teeth small, setaceous, in many rows. Tongue short, awl-form, smooth, free. The palate rough with teeth. The eyes large, high, near each other, orbicular; the upper edge of the orbit armed with curve spines. Nostrils small, near the orbit, with a small cirrus or pinnula, between them.

Branchial opercula two-leaved, partly squamous, moveable, armed with straight spines pointing backward; the membrane exposed; aperture lateral and gular, arched.

The *trunk*. The back somewhat arched, roundish; the sides convex, compressed, the throat and abdomen convex; the tail attenuated, compressed, roundish. Lateral line carinate, descending obliquely from the point of the first opercula, it proceeds straight and nearly middle to the tail. The anus small, and distant from the head.

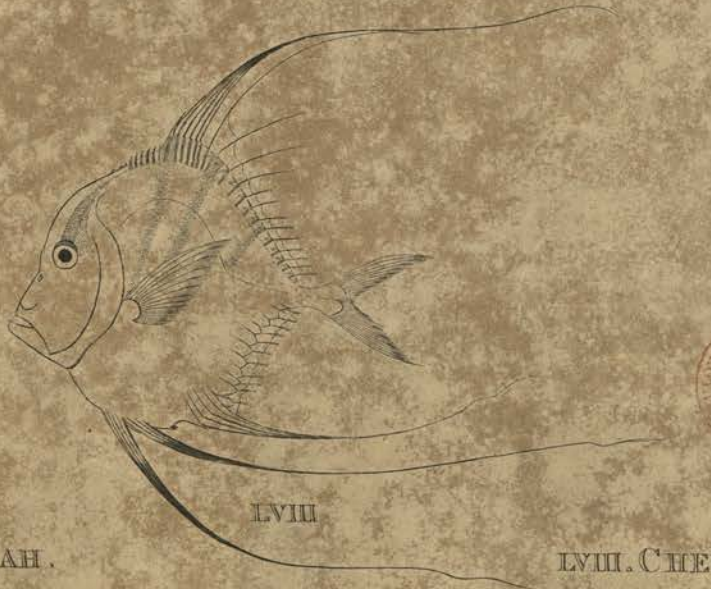
The *fins*. The solitary dorsal fin occupies the whole of the back, the twelve spinal rays forming an arch, the others ascending; the pectoral broad, and pointed; the ventral and anal short; the caudal oblong, rounded.

The *colour* of the head and body dark, with a mixture of dull red; the throat and belly are of a pink colour. The fins irregularly streaked black and red; the ventral at its root is pink, like the belly.

The *length* including the caudal fin nearly seven inches.

MOOROO BONTOO.

LVII



LVIII

LVII. GURRAH PARAH.

LVIII. CHEWOOLA PARAH.

# ZEUS.

## GENERIC CHARACTER.

*Caput compressum, declive: labium superius membrana transversa fornicatum. Lingua subulata.*

*Membrana branchiostega radiis* vii. *perpendicularibus; infimo transverso. Corpus compressum, tenue, splendens.*

The head compressed, declivous: the upper lip arched (furnished with a membranous velum attached before, and loose behind). The tongue awl-shape.

Seven perpendicular rays in the branchial membrane, the lowest transverse. The body compressed, thin, splendent.

## No. LVII.

ZEUS *corpore sub-rhomboido; radiis quibusdam pinnæ dorsalis, ventralis, anique, longioribus, in setas longissimas coadunatis; cauda profunde bifida,*

The ZEUS with a body somewhat rhomboid; several rays in the dorsal, ventral, and anal fins, uniting respectively, form very long setaceous tails; the caudal fin deeply divided.

*Zeus Gallus, Linn. S. N. p.* 454.

Called by the Natives GURRAH PARAH.

*B.* vii. *D.* $\frac{5}{25}$. *P.* 17. *V.* 6. *A.* $\frac{1}{18}$. *C.* 22.

THE *body* nearly rhomb-form, compressed, very thin, without scales, smooth, shining.

The *head* large, declivous, much compressed, front very steep, and carinate; the nose large, emarginate. The mouth low, terminal, oblique, wide. The jaws nearly of equal length, extractile, feel to the finger like a file; the lips thin.

Teeth hardly visible, minute, set in many rows. Tongue short, linear, free, smooth. Palate tuberculate.

The eyes middle, at the root of the nose, close together, round, large, flat. Nostrils small, oval, between the orbit and the nose.

The opercula oblong, rounded, smooth, moveable; branchial membrane small, covered; the aperture large, lunated.

The *trunk*. The back arched, carinate; the sides much compressed; the throat and belly straight; the posterior part of the tail almost round, and very small. The lateral line forms an arch above the pectoral fin, and then runs straight to the tail, being carinate towards its termination. The anus near the throat.

The *fins*. The dorsal assurgent and declining; five short spines compose the first five rays; the next five are very long, and joining together form a setaceous tail, between six and seven inches in length; the next four rays are also long and setaceous, but shorter; the rest of the fin is low, equal, with eleven fibrous rays. The pectoral, middle, moderate length, and falcate; the ventral near the anus, the second and third rays the

longest, and joining with the other four, form a setaceous tail, like that of the dorsal. The anal, opposite to the dorsal, but shorter, forms, by the junction of the anterior rays, a setaceous tail also; but neither are equal in length to that of the dorsal; the caudal profoundly bifid; the lobes equal, sharp.

*Colour.* The ground colour of the upper parts, when the fish is fresh caught, is golden, reflecting a variety of changeable tints; the belly and parts under the lateral line, silvery, intermingled with mother of pearl; but these beautiful colours quickly vanish, and give place to five or six dusky transverse bands, not visible in the recent fish.

| | Inches. | Lines. |
|---|---|---|
| Length from the rostrum to the caudal fin - - - - - | 4 | 6 |
| of the caudal fin - - - - - - - - - - - | 1 | 5 |
| Greatest breadth - - - - - - - - - - - - - | 3 | 5 |
| Length of the long dorsal rays - - - - - - - - | 6 | 6 |
| of the ventral - - - - - - - - - - - - | 4 | 5 |

## No. LVIII.

ZEUS *corpore sub-orbiculare, maxilla inferiore longiore; radiis quibusdam pinnæ dorsalis, ventralis, anique, filiformis, longissimis; aculeis ante pinnam dorsi et ani.*

The ZEUS with a somewhat orbicular body; the under jaw longer than the upper; some rays of the dorsal, ventral, and anal fins, very long and filiform; spiculi before the dorsal and anal fins.

*Zeus Vomer. Linn. S. N. p.* 454.

Called by the Natives CHEWOOLA PARAH.

*B.* vii. *D.* $\frac{7}{27}$. *P.* 18. *V.* $\frac{1}{6}$. *A.* $\frac{1}{17}$. *C.* 20.

THIS fish agreeing with the one last described, in the form of the head, the teeth, tongue, branchial ossiculi, and nearly in the situation and shape of the fins, differs specifically in various circumstances. The body is more orbicular, the belly being more rounded; the lateral line forms a higher arch and is not carinate; the pectoral fin is shorter, acuminate above, but not falcate; the caudal lobes are setaceous at the points; on the ridge before the spinous rays of the dorsal fin, are three small prickles which hardly appear above the skin; two others more visible, are found between the ventral fins and the anus.

The *colour* above the line is leaden, the rest silvery; but the sides are streaked conspicuously with three or four oblique fillets of a dark colour. The long rays of the fins are very slender, and being of a green colour, look at first sight, like the fibres of some marine plant entangling them.

| | Inches. | Lines. |
|---|---|---|
| The *length*, from the nose to the caudal fin, - - - - - - - - | 2 | 6 |
| Greatest breadth of the body - - - - - - - - - - - - | 2 | 0 |

LIX.

LX.

KAUKI SANDAWA.

AMBATA KUTTEE.

## No. LIX.

ZEUS *cauda lunulata; corpore sub-rhombeo; pinna ventrali unica, exiguissima.*

The ZEUS with a tail slightly lunated; a body somewhat of a rhombic form; the ventral fin single, and extremely small.

Called by the Natives KAUKI SANDAWA.

*B.* iv. *D.* $\frac{8}{38}$. *P.* 16. *V.* $\frac{1}{5}$. *A.* $\frac{3}{32}$. *C.* 22.

THE *body* somewhat rhomb-form, but the lower part towards the anal fin, more expanded than the back; compressed, squamous, and rough.

The *head* compressed, with scales on the vertex only; the rostrum projecting a little. The mouth, in respect to the tail, is middle, but much more distant from the anal than the dorsal fin, it appears very small, when shut. The jaws extractile, the upper longest, and rough as a file. The eyes near the rostrum, large, round. Nostrils small, round, double. The opercula smooth, the membrane concealed.

The *trunk*. The back assurgent, carinate; the breast and belly declivous to the anal fin; the sides very compressed. The lateral line arched. The anus distant from the tail.

The *fins*. The dorsal and anal are alike in shape, the spines and two first soft rays assurgent, then declining, and the last ten rays equal; the pectoral low, short, acuminate above; the ventral fin single, remarkably small, consisting of one short spine, and three or four setaceous rays; the caudal slightly concave or lunate. All the fins are squamous.

The *colour* silvery, with three dusky, oblique streaks on the shoulder; the dorsal fin yellow, with a black margin; the anal white, with a black margin; the caudal is yellow, slightly tipped with black.

| | Inches. |
|---|---|
| The *length*, including the tail, - - - - - - - - - - - - | 5 |
| The greatest breadth - - - - - - - - - - - - - - - | 4 |

### REMARKS.

I am in doubt whether this subject ought not to have been placed with the Chætodons. In the ventral fin it differs from any I have yet met with of that genus.

## No. LX.

ZEUS *corpore alepidoto, ventricoso; pinna ventrali unica, radiis duobus longioribus; pinnulis triginta loco pinnæ analis.*

The ZEUS with a naked body, and a very prominent belly; the ventral fin single, with two rays longer than the rest; thirty short pinnulæ in place of an anal fin.

Called by the Natives AMBATA KUTTEE.

*B.* v. *D.* 45. *P.* 16. *V.* 6. *A.* 34. *C.* 24.

THE *body* of a singular form, much compressed, the lower and hinder parts enormously expanded; altogether without scales.

The *head* large, high, compressed; rostrum short, obtuse. The mouth, when shut, small; lips thin. The jaws extractile in an extraordinary degree, forming a kind of tube when extended, and rough to the touch; the

tongue and palate smooth. Eyes middle, in respect to the mouth; moderate size, orbicular. Nostrils double, distant from the orbit. Opercula polished, silvery; the branchial membrane exposed.

The *trunk*. The back gently arched; the breast and belly declivous to the ventral fin, whence the hinder part ascended circularly to the tail; both were thin and carinated; the sides much compressed. The lateral line rising from the acuminate edge of the operculum, was hardly bent, and terminated unusually at the upper edge of the tail. The anus nearly middle.

The *fins* were all simple, and in other respects differ remarkably from others of this genus. The first twenty rays of the dorsal, slender, and declined gradually, the last twenty five nearly equal in length, capillaceous, and hardly connected by any membrane. The pectoral fins situated close to the branchial apertures, of moderate length, and the rays declined from the upper part; the single ventrical fin, close to the anus, had two setaceous rays united, nearly two inches in length, with four very short capillary rays; the anal consisted of thirty-four short pinnulæ, fringing, as it were, the posterior lower edge of the fish; the caudal fin deeply bifid.

The *colour* of the back leaden, with several rows of dark spots of various sizes; below which, the sides and belly roughly silverized, resembling the back of a mirror, but the colour, on handling adheres to the finger. The head and opercula are also silvery, but burnished.

The *length* four inches, the breadth three.

### REMARKS.

Not being acquainted, when in India, with the Zeus insidiator, which appears to have been described and transmitted from India by Dr. Koenig; and of which a figure has been given by Bloch;* I was at a loss to what genus to refer the present subject, and the seven fishes following, all which agree in the singular construction of the jaws, with the Insidiator, though differing widely in other respects.

The Zeus ore angusto of Bloch, (Insidiator Gmel. Linn. p. 1221) has seven branchial ossicles, and the fins have some spinous rays: it is, besides, a fresh-water fish. The present subject has only five branchial ossicles, no spinous rays in the fins, and, as well as the rest following, are caught in the sea.

The affinity of all, however, in the protrusion of the jaws, and (the present and another excepted) in the similitude in shape to others of this genus, has procured them a place here: at least for the present.

## No. LXI.

ZEUS *corpore rhombeo, squamoso; cauda bifida; spinis dorsalibus octo; membrana pinnæ dorsalis antice macula insignita.*

The ZEUS with a rhombic, squamous body; a forked tail; eight spines in the dorsal fin, and the fore part of the membrane marked with a large spot.

Called by the Natives GOOMORAH KARAH.

$B.$ iv. $D.\frac{8}{24}$. $P.$ 15. $V.\frac{1}{6}$. $A.\frac{3}{17}$. $C.$ 18.

THE *body* broad-ovate, or somewhat rhomb-form, much compressed, thin, resplendent; scales extremely small, close, tenacious.

The *head* declivous, broad thin, without scales, polished; front a little depressed; crown carinate, rostrum obtuse.

The mouth small, but the maxillæ so constructed, as to render it extractile and retractile, in an uncommon degree. There were no lips. The cheeks composed of fine, glassy, membranes, and the thin cartilages

* Pl. 192.

LXII.

LXI.

GOOMORAH KARAH.

TOTTAH KARAH.

extending them being perfectly white, gave to the whole, when protruded far beyond the rostrum, a tubular appearance, pellucid, glistening.

Teeth minute, perceptible only to the finger. Tongue short, round, smooth, free. Palate smooth. Eyes supreme very large, orbicular, not prominent; iris pearl. Nostrils double, close on the rostrum, the posterior largest. Branchial opercula smooth, oblong-rounded, the posterior a little acuminate; the membrane covered, four-rayed; aperture small.

The *trunk*. The back arched, carinate, the sides much compressed; the breast sub-carinate, the belly arched, the tail small, thin. The exterior branchiæ pectinate, on the inside. Lateral line, from the upper edge of the opercula, gently arched, and ending at the middle ray of the caudal fin. The anus nearer the head than the tail.

The *fins*. The dorsal rising from the highest part of the back, was continued to near the caudal fin; it consisted of eight declining, spinous, rays, (the first excepted, which was very short,) and sixteen ramous rays nearly equal in length, resembling united pinnulæ. The pectoral fin middle, short, acuminate above. The ventral shorter, with one spinous, and five ramous rays. The anal of the same form as the dorsal, but shorter, with one short, and two longer spines. The caudal bifid, the lobes sub-lanceolate.

The *colour*. The upper part of the head of a greenish yellow; all the rest, as well as the trunk, a shining white, changing in different lights like mother of pearl. The fins a pale yellow; and there was an irregular black spot on the middle of the dorsal fin.

The *length* of the subject five inches and a half; and it is seldom they are met with of greater length.

## No. LXII.

*Zeus corpore rhombeo, squamoso; cauda biloba; spinis dorsalibus mollibus septem.*

The Zeus with a rhombic, squamous body; a tail divided into two unequal lobes; and seven soft dorsal spines.

Called by the Natives Tottah Karah.

*B.* v. *D.* $\frac{8}{24}$. *P.* 17. *V.* $\frac{1}{6}$. *A.* $\frac{3}{17}$. *C.* 24.

This pisciculus agrees in most circumstances so exactly with the one immediately preceding, that it may suffice to mention the few in which they differ.

The eyes are smaller, and not so high; the lateral line forms a higher arch, and terminates near the upper edge (not at the middle) of the caudal fin; the spines of the dorsal fin are slender; the pectoral fins situated lower; and the caudal is divided into two unequal lobes, the under being broadest.

The *colour* a bright silver, with a few pale yellow bands on the sides. The dorsal, ventral, and anal fins, orange at the roots; above, glassy; the pectoral and caudal glassy, with a faint cast of yellow at the edges.

The *length*, of the subject nine inches; which was an uncommon large size, as they seldom exceed seven.

### REMARKS.

This fish when dressed tastes like the whiting. Two inches is their common size. They are caught, like the former, in vast numbers, and cured for the use of the inland countries.

## No. LXIII.

ZEUS *corpore rhombeo; cauda bifida; spinis dorsalibus octo, analibus majoribus duabus.*

The ZEUS with a rhombic body; a forked tail; eight dorsal, and two larger anal spines.

Called by the Natives KOMAH KARAH.

*B.* iv. *D.* $\frac{8}{24}$. *P.* 18. *V.* $\frac{1}{6}$. *A.* $\frac{3}{17}$. *C.* 22.

THIS in its shape approaches somewhat nearer the rhomboid, but in all other material circumstances, agrees with the species already described. The eyes are a little more prominent, and the upper edge of the orbit prickly. The teeth larger than in the former, and somewhat curve. The lateral line terminated at the middle ray of the caudal fin; the pectoral fin inclined more to a falcate form; the caudal equally divided.

The *colour* silvery, as in the last species, but with bands of dusky yellow, between the back and lateral line. The spinous part of the dorsal fin, yellow at the bottom, and black above. The pectoral and ventral glassy; the anal, caudal, and hinder part of the dorsal pale yellow.

The *length* five inches.

### REMARKS.

There was another species (not drawn) distinguished by the name of Sudoon Karah, differing from the above in colour; in the body being a little more oblong; and in the gums being rough like a file, without visible teeth.

The *colour* universally silver, but the throat remarkably burnished; the belly white, not bright, the back reflecting various tints, from a silvery ground.

*Length* five inches.

## No. LXIV.

ZEUS *corpore rhombeo; cauda bifida; spinis dorsalibus novem; pinnis ventralibus parvis, muticis.*

The ZEUS with a rhombic body, and a forked tail; nine dorsal spines; the ventral fins small, and without spines.

Called by the Natives BINDOO KARAH.

*B.* iv. *D.* $\frac{9}{24}$. *P.* 15. *V.* 5. *A.* $\frac{3}{18}$. *C.* 22.

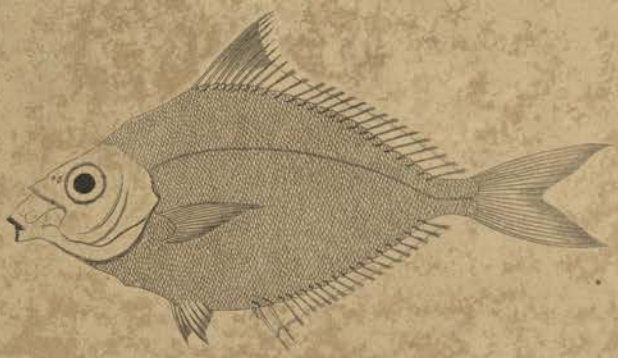
THIS small fish comes nearest to the last in its shape, but in other characters agrees to the description of the first species, with the few following variations. The back before the dorsal fin was not only carinate, but to the finger felt serrated; distinct from the fin there was a small recumbent spine pointing forward; the scales rather less perceptible; the pectoral fin less falcate than in the last; the ventral had no spinous ray, and was much shorter than in any of the former species.

LXIII.

LXIV.

KOMAH KARAH

BINDOO KARAH



DACER KARAH

KARAH

The *colour*, like the rest, was silvery, yet less bright above the lateral line: all the fins were of a pale yellow, except the anterior part of the dorsal, and whole of the tail, which were orange.

*Length* four inches. I never found them exceed six.

REMARKS.

These also are prepared in the same manner for the supply of the inland countries.

## No. LXV.

ZEUS *corpore ovale; cauda bifida, sub-falcata; spinis dorsalibus, mollibus, declinatis, septem; macula obscura in pinna dorsi.*

The ZEUS with an oval body; a bifid, somewhat falcate tail; seven declining soft spines in the dorsal fin, and a darkish spot on the membrane.

Called by the Natives DACER KARAH.

*B.* . *D.* $\frac{8}{24}$. *P.* 16. *V.* 5. *A.* $\frac{3}{21}$. *C.* 20.

IN shape, this is more exactly ovate than any of the former, but in other respects differs from the last, chiefly in colour; in the back not being serrate; and in wanting the recumbent dorsal spine.

The *colour* a bluish white, somewhat darker on the back, and lighter on the belly; a broad yellow fillet from the opercula to the tail. The fins pale yellow, and a large dark spot on the fore part of the dorsal fin.

The *length* of the subject four inches, and seldom exceeds eight.

It is cured in the same manner as the former.

## No. LXVI.

ZEUS *corpore ovale, alepidoto, maculis oblongis vario; cauda bifida; radio dorsali analique secundo longiore.*

The ZEUS with an oval, naked, body; variegated with oblong marks; a bifid tail; and the second ray of the dorsal and of the anal fin very long.

Called by the Natives KARAH.

*B.* . *D.* $\frac{8}{24}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{17}$. *C.* 22.

THE paper containing the description of this pisciculus having been lost, I can say nothing more from recollection than that it possessed the general characters of those already described, and was of a silvery white, variegated, in the manner expressed in the drawing, though the exact colours are not remembered.

The *length* of the second dorsal and anal fins is a conspicuous character.

## No. LXVII.

ZEUS *corpore oblongo-ovato, squamoso; cauda bifida; radio dorsali secundo perlongo.*

The ZEUS with an oblong-ovate, squamous body; a forked tail; and the second dorsal ray very long.

Called by the Natives WODAWAHAH.

*B.* vi. *D.* $\frac{9}{20}$. *P.* 15. *V.* $\frac{1}{6}$. *A.* $\frac{3}{11}$. *C.* 18.

THE *body* oblong-ovate, much compressed, thin, scales large, ciliate, imbricate, tenacious.

The *head* declivous, thin, compressed; without scales, the front depressed, a little grooved; the rostrum short, obtuse. The structure of the mouth, the maxillæ, teeth, tongue, palate, eyes, nostrils, and opercula, as in the preceding species, but the branchial membrane had six rays.

The *trunk*. The back more arched than the abdomen, carinate; the sides and tail compressed; the latter rather broad near the fin; the abdomen rather flat. The branchiæ tuberculate. The lateral line conspicuous, supreme, very gently curve to the end of the dorsal fin, then straight. The anus nearer the tail than the head.

The *fins*. The dorsal long, consisting of nine spinous and ten ramous rays; the first spine very short, the second very strong, and ends in a setaceous tail, nearly equal in length to the body; the other spinous rays soft, and a little longer than the ramous. The pectoral fins long, narrow, falcate; the ventral long, broad; the anal had three spines and eight small, declining, ramous, rays; the caudal bifid.

The *colour*. The upper part of the head and back, of a darkish green, all the rest, especially the breast and abdomen, a bright silver. The fins glassy, with a faint yellow cast.

The fish described six inches in length, and they seldom exceed eight.

### REMARKS.

This fish is caught in the same season with the others, and cured in like manner. It agrees in the structure of the mouth, as well as in most other characters, but differed in some not immaterial: the shape is different, the scales larger; the pectoral fins longer, and the anal much shorter, than in any of the six preceding species; to which it may be added, that the branchial membrane has six rays

## No. LXVIII.

ZEUS *corpore ovato, squamoso; cauda bifida; radio dorsali secundo longiore, capillaceo; spina anali unica.*

The ZEUS with an ovate squamous body; a forked tail; the second ray of the dorsal fin long and capillary; a single anal spine.

Called by the Natives WOODAN.

$$B.\ v.\ D.\ \frac{8}{21}.\ P.\ 15.\ V.\ \frac{1}{6}.\ A.\ \frac{1}{10}.\ C.\ 18.$$

THE principal differences of this pisciculus from the preceding, are a little variation in shape, the posterior portion of the dorsal fin by rising more in an arch, having more of an interrupted appearance; and the solitary spine in the anal fin.

There is very little difference in colour, but a row of blackish dots runs along the bottom of the dorsal fin, not found in the other.

The *length* seldom exceeds four inches.

### REMARKS.

I have before expressed my doubts of the propriety of placing some of the preceding subjects under the genus Zeus, more especially No. LIX. which bears so strong an affinity to the genus Chætodon. Similar doubts subsist also in respect to No. LXVI. LXVII. and LXVIII. I was in hopes of receiving, in time before the publication of these papers, specimens of the above dubious fishes, from India, but have been disappointed.

Should No. LIX. prove a Chætodon, the smallness of the ventral fins presents a good specific character.

# PLEURONECTES.

GENERIC CHARACTER.

*Caput parvum; oculi sphærici, ambo in eodem latere capitis. Os arcuatum, maxillæ dentatæ, inæquales. Operculum tribus laminis (in plurimis) constans. Membrana branchiostega radiis* iv.—vii. *Anus capiti propior.*

*Corpus compressum, carinatum, altero latere sub-convexo, dorsum; altero plano, pallidiore, abdomen.*

The head small; the eyes spherical and both on the same side of the head; the mouth arched; jaws unequal; set with teeth. The operculum usually of three laminæ. The branchial membrane from iv. to vii. rays. The anus nearer the head than the tail.

The body compressed, carinate; one side somewhat convex, answering to the back; the other flat, and of a paler colour, to the belly.

## No. LXIX.

PLEURONECTES *oculis dextris; ore magno, ascendente; dentibus sparsis, acutis; corpore ovali, glabro; cauda in medio parum productior.*

The PLEURONECTES with eyes on the right side; a wide ascending mouth; sharp teeth, scattered; a smooth, oval body; the caudal fin projecting a little at the middle.

Called by the Natives ADALAH.

*B.* vii. *D.* 52. *P.* 14. *V.* 6. *A.* 39. *C.* 18.

THE *body* oval, much compressed; scales small, orbicular, imbricate, tenacious.

The *head* small, compressed, sharp; the rostrum without scales. The mouth large, ascending obliquely; the jaws long, straight, extractile; the teeth of unequal size, not in a close row, long, sharp, a little curve. The tongue short, roundish, emarginate, smooth at the point, rough towards the root. The palate set with small teeth. The eyes on the right side, large, globular, prominent, both on a line, one close to the vertex, the other near the posterior edge of the mouth. The nostrils small, round, one before the other, on a line with the superior edge of the orbit. The branchial opercula consist of two laminæ, the posterior pointed; the branchial membrane of seven rays.

The *trunk*. The back and belly carinate, the sides compressed, very little convex; the upper or right side (which is common to this genus) dusky, the opposite side white. The tail flat. The lateral line rising from the top of the posterior operculum, after inclining by a gentle bend, runs straight along the middle of the tail. The anus is situated near the ventral fins in the carina of the belly.

The *fins*. The dorsal rising an inch and a half from the rostrum, is continued to within the same distance of the caudal fin; the anal nearly of the same length, terminates exactly opposite: the rays of both incline

ADALAH.

JERREE POTOO A.

to the tail. The pectoral fins situated low, and consist of short declining rays; the ventral a little more forward than the pectoral. The caudal undivided, oblong, juts out a little obtusely at the middle.

The *colour* of the upper side a dark gray, the lower, or blind side, a dull white.

| | Feet. | Inches. | Lines. |
|---|---|---|---|
| *Length* from the rostrum to the middle of the caudal fin | 1 | 0 | 3 |
| Breadth | 0 | 4 | 3 |

## No. LXX.

PLEURONECTES *oculis dextris; corpore oblonga ovata, pinnis dorsi anique caudali junctis, sed non coadunatis; cauda brevi, rotundata.*

The PLEURONECTES with eyes on the right side; an oblong-ovate body; the dorsal and anal fins join the caudal, without coalescing; the tail short and rounded.

Called by the Natives JERREE POTOO. A.

*B.* v. *D.* 68. *P.* 6. *V.* 4. *A.* 59. *C.* 18.

THE *body* oblong-ovate, much compressed; covered with very small orbicular scales, ciliate, imbricate, and rough to the touch; dark on one side and whitish on the other.

The *head* very small, short, compressed, the front and rostrum carinated.

The mouth terminal, small, curve; the lips thickish, the lower (on the right side) being curled and hairy. A few very small, sharp, teeth only visible on the left side, at the corner of the curled mouth. The tongue small, smooth, immoveable. The eyes near the rostrum, and close on the corner of the mouth, small, orbicular. The nostrils double, the anterior with a small valve.

The branchial operculum consists of one lamina; the membrane concealed.

The *trunk*. The back and abdomen carinate; the sides much compressed; the tail thin. The lateral line, after making an arch over the eyes, runs straight along the middle of the tail. The anus thoracic, between the ventral fins.

The *fins*. The dorsal rising from near the mouth, is continued to the tail; the anal fin on the opposite edge, joins also with the tail, but neither in such a manner as not to be distinguished from the caudal rays: both are narrow, only widening a very little in the middle; the pectoral are situated near the branchial aperture, short, distinct, rounded; the ventral extremely small, and being partly adipose, the rays with difficulty can be counted; they cover the anus; the caudal small and round.

The *colour*, as already remarked, dark on one side, and whitish on the other. The dorsal and anal fins are of a darkish brown, with a narrow white edging.

| | Inches. |
|---|---|
| The *length*, | 9 |
| breadth, | 3 |

### REMARKS.

This species appears seldom, and is never brought to the European tables.

Another species still more different from the common sole, and which is found in abundance, will be mentioned hereafter.

## No. LXXI.

PLEURONECTES *oculis dextris; corpore ovato, fasciato; spinulis ad radices pinnarum dorsi anique; cauda lata, mucronata.*

The PLEURONECTES with eyes on the right side; an ovate body, striped transversely; spinuli at the roots of the dorsal and anal fins; a broad, pointed, tail.

Called by the Natives JERREE POTOO. B.

*B.* v. *D.* 64. *P.* 7 *vel* 8. *V.* 6. *A.* 58. *C.* 20.

THE *head* and body much compressed, the back, breast and abdomen carinate.

The two sides, (as usual in this genus,) of different colours. Mouth small. There are no teeth in the jaws; the tongue short, sharp-pointed, and loose, the eyes of a beautiful emerald colour. The branchial membrane visible; the lateral line rising a little above the pectoral fin, runs bending very gently to the tail, but nearer the back than the belly.

*Fins.* The dorsal rises from the vertex, on a line with the eyes; the anal immediately below the anus; both are continued to the anal fin, without coalescing with it, and a row of minute spiculi runs along the roots of both, on the coloured, or right side. The pectoral fin rather high, small, pointed; the ventral also small, longitudinal, solitary; the caudal fin is pointed and marked with five oval spots.

The *colour* of the right side a dusky brown, striped transversely with thirteen or fourteen narrow bands of a lighter brown shade, which are continued on the dorsal and anal fins. The spots on the caudal fin are white, with a little mixture of black and yellow.

*Length*, five inches and a half.

### REMARKS.

This seems to be the rarest of the genus, and, like the former, was never brought of larger size.

## No. LXXII.

PLEURONECTES *oculis dextris; corpore oblongo, fasciato; pinnis pectoralibus nullis; radio primo pinnæ dorsi longiore.*

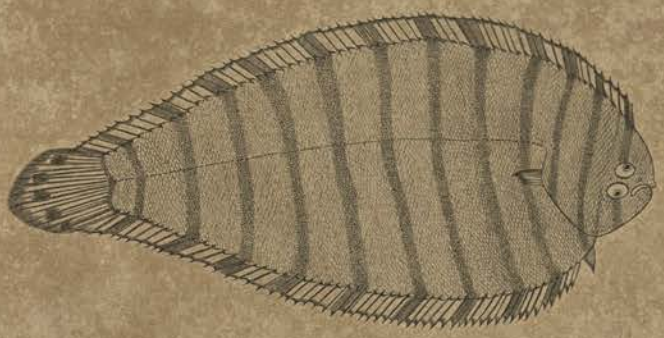
The PLEURONECTES with eyes on the right side; an oblong body striped transversely; no pectoral fins; the first dorsal ray longer than the others.

Called by the Natives JERREE POTOO. C.

*B.* iv. *D.* 73. *P.* 0. *V.* 5. *A.* 63. *C.* 18.

THIS small fish agreeing in its general form with the preceding, differs in the following circumstances. The eyes are placed less obliquely, round, and much smaller; the first ray of the dorsal fin thick, and longer than the others; the pectoral fins are wanting; the ventral much smaller, and just above the anus, which is in the

carina of the abdomen.



LXXI

LXXII

LXXI. JERREE POTOO B.

LXXII. JERREE POTOO C.

JERREE POTOO. D.

The mouth, tongue, nostrils, junction of the dorsal and anal fins with the tail, are all as in the fish last described, but the lateral line rising nearer the mouth, forms a small arch before it becomes straight.

The *colour* of the right side dark gray, with cross fillets of light brown from the front to the tail; the caudal fin spotted with brown spots with black edges; the left side light coloured.

*Length* five inches.

## No. LXXIII.

PLEURONECTES *oculis sinistris; corpore lanceolato; lineis lateralibus duabus utriusque; pinnis pectoralibus carens; pinnæ dorsi, caudæ, anique unitæ; cauda attenuata, acuta.*

The PLEURONECTES with eyes on the left side; the body lanceolate; a double lateral line; no pectoral fins; the dorsal, caudal, and anal fins united; the tail terminates in a sharp point.

*B.* iv. *D.* 148. *P.* 0. *V.* 4. *A.* 111. *C.* 10.

Called by the Natives JERREE POTOO. D.

THE *body* lanceolate, much compressed; scales rather small, orbicular, imbricate, adherent, feel rough when stroked upwards. Of a dark colour on the left side, and white on the other.

The *head* narrower than the body, ovate, compressed; the rostrum long, compressed. The mouth not terminal, as in the English sole, but at some distance from the extremity of the rostrum, on the verge of the abdomen; not corrugated on the dark or left side, but rough with some small tubercles and pili on the white side. The tongue and teeth as in No. LXX.

The eyes placed obliquely (though sometimes on an even line) between the lateral line and corner of the mouth, small, orbicular. The nostrils single, divided by a membrane: and situated between the eyes, or rather a little nearer the nose.

The *trunk*. The back and abdomen carinate; the tail terminates in a sharp point. The principal lateral line commences at the middle point of the rostrum, and bending gently over the eyes, proceeds in a straight line to the tail. The second line is much higher, and runs parallel with the back. The anus is not in the carina of the abdomen, but a little on one side, giving place for a membrane which connects the ventral fin with the anal.

The *fins*. The long dorsal rises at the centre of the rostrum; the anal near the branchial aperture: they are of equal breadth, and both are united with the caudal fin, in such a way as hardly to be distinguished, and, with the few caudal rays, composing the pyramidal sharp pointed tail. There are no pectoral fins; and the solitary ventral is connected with the anal.

The *colour* of the left side blackish; of the right white; the dorsal, anal, and caudal fins, have a purplish cast.

*Length* of the subject described, one foot five inches; greatest breadth, three inches two lines.

### REMARKS.

This is the sole most common in India, and reckoned in delicacy even superior to that of England. The specimen drawn was of the largest size found at Vizagapatam; but, at Caringa, I have seen them considerably larger.

## No. LXXIV.

PLEURONECTES *oculis sinistris; corpore lanceolato, scabriusculo; ore cirroso in latere sinistro; lineis lateralibus duabus; pinnis pectoralibus nullis; pinna dorsi anique, caudali connatæ.*

The PLEURONECTES with eyes on the left side; the body lanceolate, somewhat rough; the mouth cirrous on the left side; two lateral lines on each side; no pectoral fins; the dorsal, anal, and caudal fins united.

*Pleuronectes biliniatus Bloch. Pl.* 188.

Called by the Natives JERREE POTOO. E.

*B.* iv. *D.* 97. *P.* 0. *V.* 4. *A.* 75. *C.* 8.

THIS in general agrees with the preceding fish. It has no pectoral fins; the single ventral fin is joined to the anal by a membrane, the anus being on one side of the carina; and the junction of the dorsal and anal fins with the pointed caudal, is alike in both. There are also two lateral lines on each side; but besides these, there is here a third undulating, carinated line, from the corner of the mouth to the edge of the operculum. Other circumstances in which they differ are the following: the aperture of the mouth is not smooth on the coloured side, as in the former, but wrinkled and cirrous both above and below; the scales are smaller, as well as rougher, and the inferior edges tipped of a dusky white, gives a mixed colour, different from the uniform dark colour of the other sole, while the white of the right side is less pure: lastly, there is a marked difference in the number of dorsal and anal rays.

The *length*, ten inches; greatest breadth two inches four lines.

### REMARKS.

In this fish, Bloch met with the first instance of two lateral lines on the same side.

## No. LXXV.

PLEURONECTES *oculis sinistris; corpore rotundo-ovato, maculato; cauda pentagona, distincta.*

PLEURONECTES with eyes on the left side; a body of a round-ovate form, spotted; a pentagonal, distinct, caudal fin.

Called by the Natives NOOREE NALAKA. A.

*B.* vii. *D.* 73. *P.* 11. *V.* 6. *A.* 58. *C.* 16.

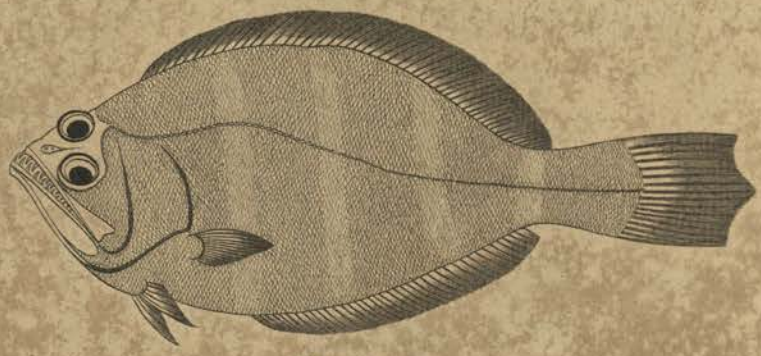
THE *body* round-ovate, much compressed, and the edges carinate; the left side dusky with a greenish cast, spotted with large, round, brown, spots; the other side of a bluish white.

The *head* small, compressed; the face without scales. The mouth terminal, large; the jaws extractile, the upper a little curve, the lower convex: both with a regular row of recurve, sharp teeth. The tongue awl-shape,

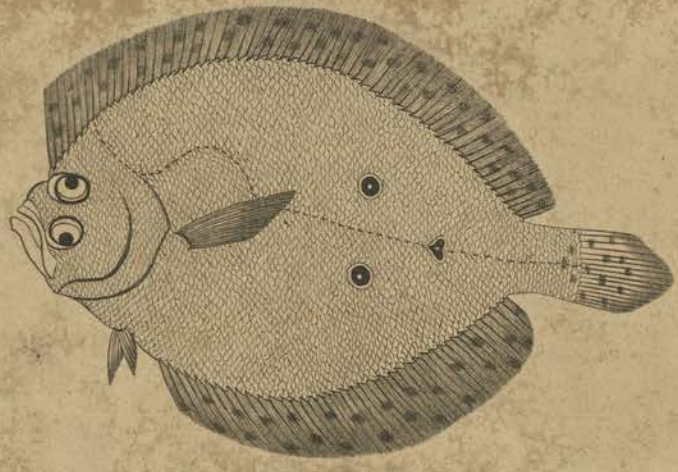
blunt, smooth.

JERREE POTOO E.

NOOREE NALAKA. A.



LXXVII.



LXXVI.



NOOREE NALAKA.

The eyes on the left side, near the vertex, the one exactly under the other, oval, large. The nostrils, on a line also, nearer the edge of the rostrum. The second branchial opercula pointed.

The lateral line forms a high arch above the pectoral fin, then sloping gently, it becomes straight: on each side of the straight part, is a faint, somewhat curve line. The anus between the ventral fins.

The *fins*. The dorsal rises above the eyes, and, like the opposite anal, widening a little as it decends, both terminate near the tail; two ventral fins larger than usual; the pectoral high, the rays declining; the caudal fin distinct, broad, pentagonal.

*Length*, from the rostrum to the caudal fin, eight inches; the greatest breadth, four.

REMARKS.

The dorsal and anal fins are sometimes spotted.

## No. LXXVI.

PLEURONECTES *oculis sinistris; pinnis ocellatis; corpore ovale, maculis ternis prope caudam insignito.*

The PLEURONECTES with eyes on the left side; ocellated fins; an oval body, and three remarkable spots near the tail.

Called by the Natives NOOREE NALAKA. B.

*B.* vii. *D.* 68. *P.* 12. *V.* 6. *A.* 47. 16.

THIS fish agrees with its genus in the compressed form of its body, and the different colour of the opposite sides; it resembles the fish last described, in the form of the jaws, and the lateral line, as also in its oval shape. There are no teeth in the jaws; the cheeks membranous; the lower eye nearer the edge of the mouth, the rays of the dorsal and anal fins are proportionally longer, and, as well as the tail, are always spotted; the oblong pointed tail, is very different from the former: the situation of the pectoral and ventral fins is the same.

The *colour* of the left side is very dark, sometimes obscurely spotted with brown; the spots on the fins are black: but the spots placed triagonally on the back (which seem to be constant) afford a good specific character: The two anterior are exactly round, jet black, with a white dot in the centre, and a rim of dusky white: the posterior of the same colour, is exactly triangular, and placed on the lateral line.

The *length*, from the rostrum to the point of the tail, five inches, six lines.

## No. LXXVII.

PLEURONECTES *oculis sinistris; corpore ovale, fasciis fuscis; linea laterali sub-undulata, aspera; cauda oblonga, in medio parum productiore.*

The PLEURONECTES with the eyes on the left side; an oval body with brown cross bands; the lateral line rough, and somewhat waving; the oblong caudal fin elongated a little at the middle.

Called by the Natives NOOREE NALAKA. C.

*B.* vii. *D.* 54. *P.* 16. *V.* 6. *A.* 39. *C.* 16.

IN the form of the body, the head, the tail; the mouth, teeth, tongue, and position of the fins; this fish agrees with the Adalah, No. LXIX.; but the scales here are smaller; the lateral line carinate; the body, though of the same colour, is distinguished by cross bands of a darkish brown; and the eyes are on the left side.

The *length* six inches.

### REMARKS.

Of the above nine species of this genus, No. LXXIV. is the only one I have found described by authors. Bloch mentions the having received a specimen of that fish from Tranquebar.

The addition in Gmelin's edition of Linnæus consisting of eight or nine new species, made the whole amount to twenty-six, and to these, three or four have been added since.

The nets in India are not well suited for soles, which are known to feed at great depths, and require nets of a particular make. A French gentleman at Bimblipatam, undertook to direct a net of a proper construction, but the fishermen could not manage it to advantage, and we had no success.

POOL CHITSILLOO.

# CHÆTODON.

## GENERIC CHARACTER.

*Caput parvum; os exiguum, labiis retractilibus; dentes (plurimis) setacei, flexiles, mobiles, æquales, confertissimi, numerosissimi. Membrana branchialis* iii.—vi. *Corpus latum, tenue, compressum, squamis duris vestitum, pictum. Pinna dorsi anique rigida, carnosa, squamosa, ut plurimum aculeis aucta.*

The head small, mouth narrow, with retractile lips; the teeth (in many) setaceous, flexible, moveable, equal, very numerous and close. The branchial membrane iii.—vi. rays.

The body broad, thin, compressed, covered with hard scales, and coloured. The dorsal and anal fins rigid, fleshy, squamous, and generally with the addition of spines.

## No. LXXVIII.

CHÆTODON *cauda parum productiore in medio; spinis dorsalibus undecem; corpore et pinnis maculatis.*

The CHÆTODON with a tail projecting a little at the middle; the body and fins speckled.

*Chætodon Argus, Linn. S. N. p.* 464.

Called by the Natives POOL CHITSILLOO.

*B.* iv. *D.* $\frac{11}{27}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{4}{18}$. *C.* 16.

THE *body* of an irregular roundish form, much compressed, squamous, rough; scales small, orbicular, subciliate, tenacious, and (as frequent in this genus) they cover part of the fins.

The *head* small, much compressed, declivous, the crown and front only covered with scales. Mouth very small, terminal, horizontal; lips thin. The jaws of equal length, extractile. Teeth setaceous, numerous, close, equal. Tongue short, roundish, smooth, hardly moveable. Palate smooth. The eyes rather small, distant from the rostrum, high, separated from each other by a bony knob, the iris golden. Nostrils double, between the orbit and rostrum, one before the other, the anterior round, the posterior oval.

The opercula smooth, without scales, acuminate. The branchial membrane partly concealed; the aperture lateral, large.

The *trunk*. The back assurgent, carinate, the breast and abdomen slightly rounded; the sides and tail much compressed. The lateral line rising from the upper edge of the opercula, forms an arch ending at the narrow part of the tail, whence it is continued straight along the middle of the tail to the fin. The anus equidistant from the head and caudal fin.

The *fins*. The dorsal long, compound, interrupted; the first part possesses the straight ridge of the back, consisting of eleven spinous rays, lodged in a groove, into which they occasionally recline: the second part

possesses that part of the back which descends abruptly to the tail, and consists of sixteen soft, declining rays. The dorsal as well as all the other fins, except the pectoral, are covered with scales from the roots for some way upwards. The pectoral low, short, broad, declining; the ventral behind the pectoral, the second and third rays fibrous; the anal spines four, very strong, the other part of the fin resembles the soft rays of the dorsal; the caudal fin almost equal, the three middle rays only a little longer than the rest.

The *colour* of the fish a darkish grey which brightens towards the belly; the breast yellowish-white; the sides variegated by numerous round, black spots, as are also part of the dorsal, anal, and caudal fins. The rays of the fins in general darkish; and it may be remarked that the soft rays of the dorsal and anal fins, as well as the tail, remain expanded after death.

The *length* from the rostrum to the caudal fin nine inches; the broadest part of the trunk, six inches, three lines.

### REMARKS.

This fish seldom, or never, appears at the European tables at Vizagapatam. Bloch mentions it as a remarkable circumstance that petrifactions of this species are found in the mountains of Bilka in Italy. Part VI. p. 96.

## No. LXXIX.

CHÆTODON *cauda integra parum productiore in medio; spinis dorsalibus novem; corpore sub-orbiculato; ocellis viride-aureis ad latus utrinque.*

The CHÆTODON with an undivided tail projecting a little at the middle; nine dorsal spines; a sub-orbicular body; green and gold small spots on both sides.

Called by the Natives LATTE.

*B.* vi. *D.* $\frac{9}{30}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{22}$. *C.* 18.

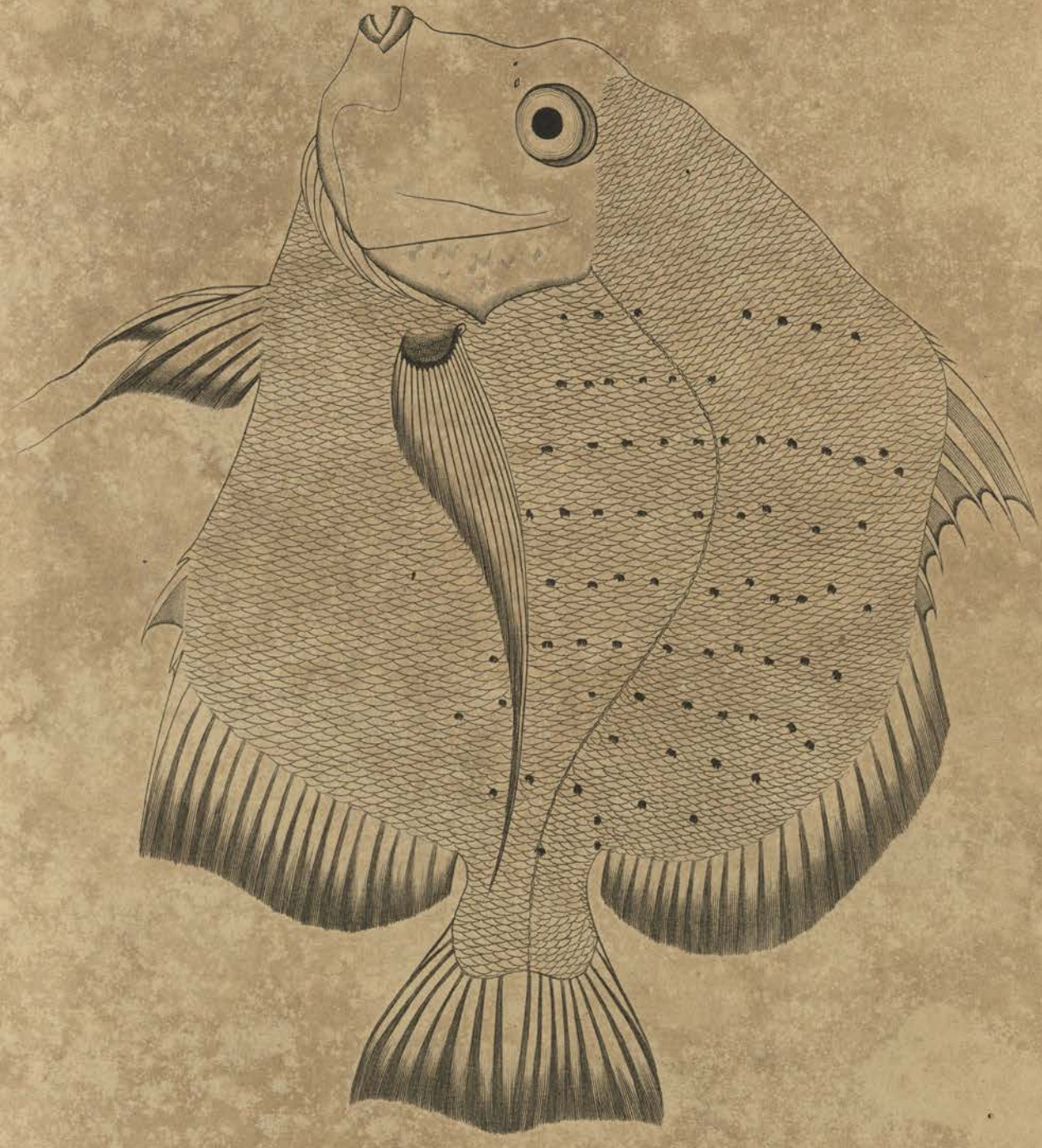
THE *body* somewhat orbicular, much compressed, nearly as broad as long. The scales oval, imbricate, and cover part of all the fins, except the pectoral.

The *head* large, much compressed; from the knob between the eyes to the rostrum very steep, without scales, except the front. The mouth low, very small, terminal, horizontal; lips thickish. Jaws extractile, the upper a little longer than the under; the teeth setaceous, numerous, close, equal; the tongue oblong, smooth, retracted, tied. The palate smooth.

The eyes supreme, distant from the point of the rostrum, large, orbicular, not prominent. The opercula smooth, without scales, the posterior leaf ciliate, acuminate. The branchial membrane exposed; the aperture large, lateral.

The *trunk*. The back assurgent and carinate to the dorsal spines, where it rises into a sort of hump and then descends gradually, but convex, to the tail; in the opposite direction, the line from the lower jaw to the anal fin, inclines gently, and then ascends circularly. The sides much compressed; the tail thin. The lateral line springing from the upper edge of the operculum, forms rather a lower arch, than in the former fish, but in like manner becomes straight near the end of the tail. The anus equidistant, oval.

The *fins*. The three first dorsal spines very short and small, and none of them nearly so robust as in the last fish, the soft rays form an arch. The pectoral fin very long, falcate. The first and second ventral rays,



LATTE.

TERLA. A.

terminate in a setaceous thread. The first and last anal spines short, the soft rays somewhat arched. The caudal fin intire, but the blunt projection in the middle rather more conspicuous.

The fins remain expanded after death, as in the former fish.

The *colour* of the upper parts a light gray, on a silvery ground, reflecting various tints in different lights, which growing lighter and lighter towards the belly, terminate in a rich mother of pearl. The knob between the eyes, the face, the opercula, and the breast look as if silverized; but what adds greatly to the beauty of the fish are small round spots of dark green and gold, disposed in regular transverse rows on the sides.

| | Inches. | Lines. |
|---|---|---|
| *Length* from the nose to the caudal fin | 9 | 6 |
| Caudal fin | 1 | 5 |
| Pectoral fin | 4 | 5 |
| Breadth between the dorsal and anal spines | 7 | 0 |

This fish is not common, and is not esteemed for the table.

## No. LXXX.

CHÆTODON *cauda integra, medio parum productiore; spinis dorsalibus octo; pinna dorsi, ani, caudæque fascia lata flavescente.*

The CHÆTODON with an undivided tail projecting a little at the middle, eight spines in the dorsal fin; a broad, yellowish band, on the dorsal, anal, and caudal fins.

Called by the Natives TERLA. A.

*B.* vi. *D.* $\frac{8}{30}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{21}$. *C.* 18.

THE *body* of this species in its form comes near the Latte. It is equally compressed and thin.

The *head* in its form, as well as the face, agree with the Latte; the position of the eyes, the nostrils, and the mouth, the lips, the tongue, and the palate are alike in both; but there is a variation in the teeth: the regular row is here wanting, the jaws only feel like a file, and in the upper are a few small curve teeth. There are a few scales on the lower part of the face, but the opercula are naked. The branchial membrane very visible.

The *trunk.* The back assurgent as in the Latte; the hump less, and the declivity from the dorsal spines less curve. The belly part of the fish as in the Latte; the hinder part to the tail more in a straight line; the lateral line and the anus in form and situation the same in both.

The *fins* in situation and shape agree very nearly also with those of the Latte. The three last dorsal spines are longer, and the posterior part of the fin more completely arched; the three anal spines are distinct, seemingly not connected with the anal soft rays.

The *colour* of the back gray, the face and belly silvery. The anterior part of the back, the membranes of the dorsal and anal fins, red; all the other fins are of a dull yellow; the opercula of a pale red.

| | Feet. | Inches. | Lines. |
|---|---|---|---|
| The *length* of the subject described | 1 | 3 | 0 |
| Greatest breadth | 0 | 0 | 9 |

## No. LXXXI.

CHÆTODON *cauda integra; spinis dorsalibus octo; fascia lata, rubra, in pinna dorsi, ani, caudæque.*

The CHÆTODON with an undivided tail; eight dorsal spines; the dorsal, anal, and caudal fins distinguished by a broad, red, band.

Called also TERLA. B.

*B.* vi. *D.* $\frac{8}{30}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{25}$. *C.* 18.

THIS species agreeing in most circumstances, excepting colour, with the one last described, may perhaps be reckoned only a variety: the variation however was found to be constant. The form of the body more rhombic; the teeth, as in the Latte, regular, setaceous, without the curve teeth in the upper jaw, as in the last species: the fins less squamous, but in like manner remain expanded after death.

The general colour silvery without spots; the lips and iris red; the membrane of the dorsal spines, and the pectoral fin slightly tinged with the same colour, but the dorsal, anal, and caudal fins distinguished by a broad band of deep red, on both sides.

*Length* ten inches.

REMARKS.

The last two fish, though of inferior quality to the Pomfrets, are superior in quality to No. LXXVIII. and LXXIX. The latter, indeed, is sometimes brought under the name Terla, and the names of the three species are often confounded by the fishermen.

## No. LXXXII.

CHÆTODON *cauda lunata; spinis dorsalibus novem; aculeo mobile in sulco, ad caudam utrinque.*

The CHÆTODON with a lunate tail; nine spines in the dorsal fin; and a moveable spine in a groove, on each side of the tail.

*Chætodon Nigrofuscus, Forskal* p. 64?

Called by the Natives MATA.

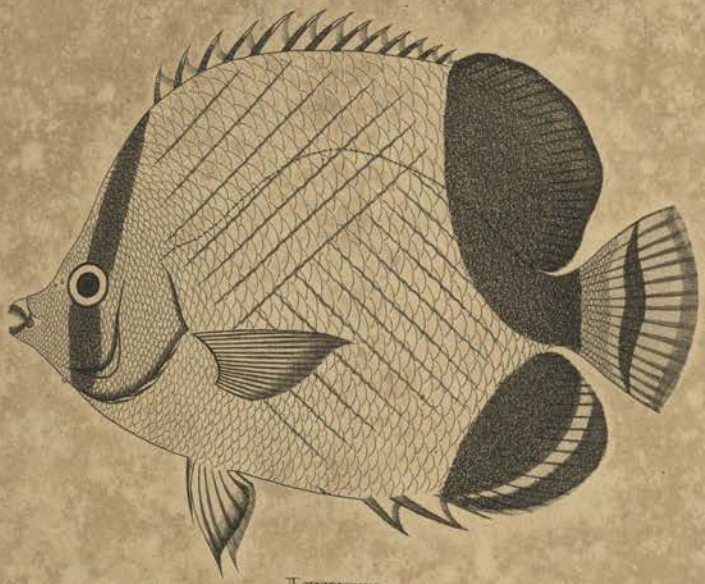
*B.* iv. *D.* $\frac{9}{34}$. *P.* 17. *V.* $\frac{1}{6}$. *A.* $\frac{3}{26}$. *C.* 18.

THE *body* perfectly ovate, much compressed, rough to the finger, but smooth to the eye; covered with very minute, oblong, tenacious scales, which are not, as in the preceding species, continued on the fins.

The *head* large, much compressed, the front declivous, but not so abrupt as in the former species, naked, yet to the touch roughish. The mouth nearer the belly than the back, small, terminal, horizontal; lips thin. Jaws of equal length, extractile. Teeth in a regular row, strong, though short, a little curve, fixed, yellow. Tongue short, small, white, tied. Palate smooth. The eyes high, large, round, nearer the opercula than the front. Nostrils near the orbit, close to each other, very small, round, the anterior largest. The opercula without scales, but roughish like the face. The branchial membrane concealed; the aperture semicircular.

TERLA. B.

MATA.



LXXXIII.

LXXXIV.

PATNAH.

MOOTA

The *trunk*. The back and belly arched and carinate. The sides and tail compressed. The lateral line high, not so much arched as the back, but descending obliquely to the narrow part of the tail, is continued waving to the root of the fin.

The anus nearly middle.

On each side of the tail where narrowest, there is an oval groove, tinged yellow on the inside, in which is lodged a moveable spine, the anterior point a little curve, the other point straight; it is furnished with a black sheath, moves as on a pivot, and, when raised, the curve point is turned foreward.

The *fins*. The dorsal and anal long, and both, especially the last, regularly assurgent; the pectoral low, broad, pointed above, declivous; the ventral contiguous, pointed in the middle. The caudal lunate.

The *colour* generally a shining black, streaked on the head and several parts of the body with longitudinal lines of very dark blue.

The dorsal and anal membranes are leathery, resembling a bat's wing; the points of the spines white.

| | Inches. | Lines. |
|---|---|---|
| The *length* from the rostrum to the caudal fin - - - | 9 | 0 |
| of the longest rays of ditto - - - - - - | 2 | 8 |
| Greatest breadth of the body - - - - - - - - - | 4 | 8 |

REMARKS.

They are sometimes brought double the size of the subject described, but seldom appear at the European tables, though a very white, firm, and palatable fish. The crescent shape of the tail distinguishes it from the Chætodon Nigricans of Linnæus,

## No. LXXXIII.

CHÆTODON *cauda sub-arcuata; spinis pinnæ dorsi tredecem; fascia nigrante ad faciem; corpore lineis obliquis fuscis striato.*

The CHÆTODON with a tail slightly arched; thirteen dorsal spines; a blackish band cross the face; and the body variegated with oblique yellowish lines.

*Chætodon vagabundus? Linn. S. N. p.* 165.

Called by the Natives PAINAH.

*B.* v. *D.* $\frac{13}{37}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{19}$. *C.* 16.

THE *body*. This species in its form resembles many others of the genus, but the scales are uncommonly large, and the head and opercula are squamous, as well as the trunk and fins.

The *head* small, much compressed, with a short, blunt, rostrum: the scales smaller than on the trunk. The mouth projects more than any of the preceding, but the wide lips, jaws, setaceous teeth, tongue, and palate are as usual in the genus. The opercula squamous, and cover, without hiding, the branchial membrane.

The *trunk*. The back assurgent from the vertex, then arched; the breast and belly are carinate like the back, but less arched; the sides and tail much compressed. The lateral line forms a high arch and terminates, as in the last fish, at the upper edge of the tail. The anus middle.

The *fins*. The spinous part of the dorsal possesses the ridge of the back, the soft part, the declivity: both

are arched, the middle rays in each being longest. The same remark may be made on the anal, which is hardly half so long. The pectoral fins, very low, about the length of the head, acuminate above. The ventral close together, shorter than the pectoral; the caudal slightly arched.

The *colour*. The ground colour a yellowish-white; a dark brown band from the ridge of the back crosses the face to the throat; seven or eight yellow lines run obliquely, parallel to each other, from the back towards the head and opercula, and from the last of these a dozen of similar lines run obliquely towards the tail and anal fin. The spines of the dorsal and anal fins are of a reddish brown, the whole of the soft fins in both are of a dark chesnut, but the anal has a cross fillet of bright yellow, and the fibrous edge is of the same colour; the pectoral and ventral are whitish; the caudal yellow, with a transverse band of dark purple in the middle, and a border of reddish brown at the extremity.

The *length*, five inches three lines; the breadth three inches, six lines.

### REMARKS.

If this be the Chætodon vagabundus of Linnæus, reference is made in Gmelin's edition to three figures in Valentine, and to an equal number in Renard's coloured figures. The former affords an instance of the liberty taken in the variation of the shape of the mouth, as the latter does of the colour of the whole fish.

## No. LXXXIV.

CHÆTODON *cauda truncata; spinis dorsalibus undecem; corpore ovato; fascia nigra ad faciem; quatuor ad latus.*

The CHÆTODON with a truncate tail; eleven dorsal spines; a black band across the face; and four on the side.

Called by the Natives MOOTA.

*B.* iv. *D.* $\frac{11}{31}$. *P.* 15. *V.* $\frac{1}{6}$. *A.* $\frac{3}{22}$. *C.* 18.

THE *body* in its compressed form, its small, roughish scales, carinated back and belly, the arched lateral line, and position of the fins, agrees with the general characters, only that the fins are not squamous.

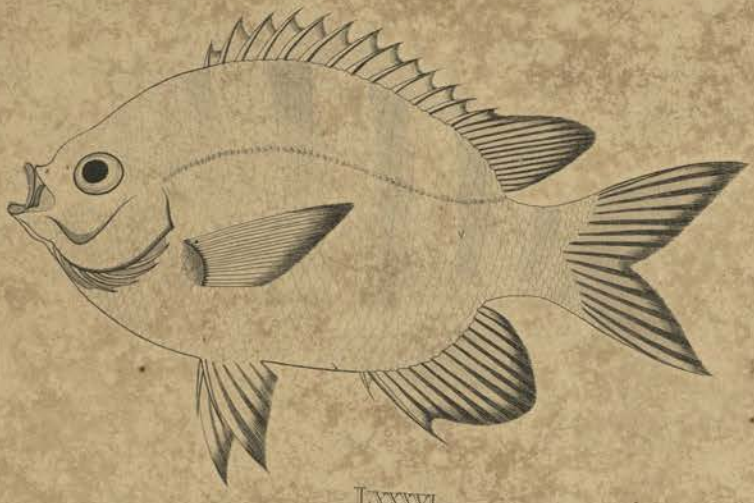
The *head* large, the front very declivous from the eye to the rostrum, which projects a little. The mouth, lips and jaws as usual: but the teeth are strong, semi-conical, not setaceous; the tongue free, obtuse, and smooth; the palate also smooth.

The *fins*. The first spine of the dorsal very short, the others, as well as the soft rays, assurgent till near the end, where the rays shorten, giving a roundness to the hinder part of the fin; the anal assumes the same form; the pectoral short, acuminate in the middle; the ventral fins of the same length, with a setaceous point; the caudal exactly equal, or truncate.

The *colour* of the upper part of the head, and the back, very dark, but on the sides it changes to a dark blue, variegated by four black streaks running from the ridge of the back to near the belly. A streak somewhat lighter crosses the face, from the crown to the throat; while another like those on the sides, sometimes crosses the tail: but in the subject drawn there were only two black dots. The fins were of a very dark blue, or, in some lights, a black colour.

The *length*, including the caudal fin, three inches and a half.

LXXXV.



LXXXVI.

CALAMOIA POTA.

RAHTI POTA.

## No. LXXXV.

CHÆTODON *cauda bifida; spinis tredecem pinnæ dorsi; corpore fasciis nigrescentibus; macula nigra ad caudam.*

The CHÆTODON with a forked tail; thirteen dorsal spines; the body variegated with blackish bands; and a black spot on the tail.

Called by the Natives CALAMOIA POTA.

*B.* v. *D.* $\frac{13}{28}$. *P.* 17. *V.* $\frac{1}{6}$. *A.* $\frac{2}{17}$. *C.* 19.

THE *body* sub-orbicular, compressed, the scales large, roundish, tenaceous, and extended on the fins.

The *head* small, compressed, squamous, except the rostrum which is naked, smooth. The mouth, teeth, and tongue, as usual, but the lips are thickish, and the palate tuberculate. The eyes, high, oval. The nostrils single, lower than the orbit, and nearer the rostrum. The opercula squamous, and moves freely; the branchial membrane is readily discovered.

The *trunk*. The back arched, carinate, the breast convex; the belly straight and thin; the tail unusually broad. The lateral line conspicuous, slightly arched, and terminates at a round black spot on the upper edge of the tail. The anus a little nearer the tail than the head.

The *fins*. The dorsal spines only a little arched, being nearly of equal length; the hinder part of the fin broader, and acuminate in the middle; the pectoral and ventral of moderate length, acuminate at top; the anal has only two spines, and the other rays are of the same form with the dorsal; the caudal divided, but not deeply.

The *colour* of the back above the line, a pale yellow, with six darkish bands, which are extended on the dorsal fin; the rest of the body cinerious, growing lighter on the belly. The fins are of a dark colour.

The *length*, including the tail, six inches six lines.

REMARKS.

This fish bears some resemblance to the Chætodon Saxatilis, Linn. S. N. p. 466.

## No. LXXXVI.

CHÆTODON *cauda bifurca; spinis pinnæ dorsalis tredecem; corpore fasciis cæruleis et maculis flavis, alternatim.*

The CHÆTODON with a forked tail; thirteen dorsal spines; and the body variegated with sky-blue bands and yellow spots, alternately.

Called by the Natives RAHTI POTA.

*B.* v. *D.* $\frac{13}{26}$. *P.* 18. *V.* $\frac{1}{6}$. *A.* $\frac{2}{14}$. *C.* 16.

THE *body* is rather more oval, than the fish last described, but in the form of the scales, the disposition and shape of the fins, opercula, lateral line, and anus, they approach very near.

The *head* is not so low, the mouth consequently more central from the back and the belly; the jaws and

teeth as described before; the lips thin, the tongue retracted, the palate smooth. The eyes lower, round, large. Nostrils double. The branchial membrane exposed; the aperture large.

The pectoral fin low, and in proportion long; the caudal a little more divided, than in the last, and the lobes sharper.

The *colour* a grayish pearl, with sky-blue bands on the sides, and a pale yellow, large, spot, between each band. The belly a dull white. The dorsal and anal fins have a bluish cast; the others a yellowish white.

The *length*, including the tail, six inches.

## No. LXXXVII.

CHÆTODON *cauda integra, medio parum productiore; spinis dorsalibus quatuor; pinna dorsi analisque sicut alæ extensis; pinnis ventralibus longissimis, falcatis.*

The CHÆTODON with an undivided tail, projecting somewhat in the middle; four dorsal spines; the dorsal and anal fins extended like wings; and the ventral extremely long and falcate.

*Chætodon Teira, Forskal. Descr. Anim. No.* 82.

Called by the Natives KAHI SANDAWA.

*B.* iv. *D.* $\frac{4}{35}$. *P.* 17. *V.* $\frac{1}{6}$. *A.* $\frac{3}{24}$. *C.* 18.

THE *body*. This species in its form differs from the others, it is transverse-oval, and the dorsal and anal fins have the appearance of wings extended. It is much compressed, covered with very minute scales, and is rough to the touch.

The *head* low, small, compressed, and, the crown and cheeks excepted, without scales. The rostrum short, blunt. The mouth small; lips thin; jaws nearly of equal length; teeth setaceous; the tongue and palate smooth. The eyes high, nearer the opercula than the rostrum, small, round, iris yellow. The nostrils stand obliquely, half way between the orbit and rostrum, the posterior oval, the other smaller, round. The posterior opercula acuminate, and lower part squamous. The branchial membrane partly exposed.

The *trunk*. The back thin, rapidly assurgent to the dorsal spines, then arched; the arch on the opposite side (the belly being hardly convex) less complete. The lateral line forms a low arch, and after waving a little terminates at the middle of the caudal fin. The anus is nearer to the gills than to the tail.

The *fins*. The dorsal and anal remaining expanded after death, forms something of a crescent, with the expanded tail projecting from the middle, but the upper limb is the longest; the dorsal ray longest measuring about five inches, and the anal four; the pectoral low, short, acuminate; the ventral falcate, ending in a setaceous tail, nearly four inches in length; the caudal fin intire, yet not truncate, the exterior rays, and two or three in the middle, being a little longer than the rest.

The *colour*, of the head, breast, and trunk, a dark gray; but a band of a still darker colour, crosses the face, and eyes, from the back to the gills, and another twice as broad crosses the body and pectoral fin: the hinder part of the fish is nearly the same colour as the band, with a tint of dark purple. The fins almost black.

| | Inches. | Lines. |
|---|---|---|
| The *length*, from the rostrum to the caudal fin, - - - - - | 4 | 5 |
| of the caudal fin - - - - - - - - - - - | 1 | 2 |
| Greatest breadth - - - - - - - - - - - - - - - - | 4 | 5 |

The *colour* in another subject, almost twice as big as the one now described, was more uniformly of a purplish black; and the bands were hardly discernible.

KAHI SANDAWA.

SAHNI TCHAPI.

### REMARKS.

This is a rich and excellent fish; having the peculiar flavour of such as feed among the rocks.

It has been accurately described by Forskal who found it in the Red sea. The figure in Renard referred to by Gmelin, exhibits an extravagant variation in colour.

## No. LXXXVIII.

CHÆTODON *cauda alba, truncata; spinis dorsalibus tredecem, radiis aliquot pinnæ dorsi unitis in setam longiorem; corpore vittis obliquis, curvis, cæruliis; aculeo curvo, vaginato, ad operculum.*

The CHÆTODON with a white, truncate tail; thirteen spines in the dorsal fin, and some of the rays united into a long filiform tail; the body adorned with oblique, curve cærulean lines; a curve, sheathed spine on the operculum.

Called by the Natives SAHNI TCHAPA.

*B.* iii. *D.* $\frac{13}{35}$. *P.* 19. *V.* $\frac{1}{6}$. *A.* $\frac{3}{24}$. *C.* 17.

THE *body*. The form of this fish is singularly clumsy. It is much compressed, very broad towards the tail; that is, between the soft portion of the dorsal and anal fins, diminishes slowly towards the obtuse head, and terminates in a short, blunt rostrum. The scales small, imbricate, tenacious, margins ciliate, rough.

The *head* not large, declivous, much compressed, without scales, roughish. The mouth small; lips very thick; jaws extractile, the upper a little longer than the lower; teeth setaceous; tongue ovate, smooth, free. Palate tuberculate. The eyes high, forward, large, round. Nostrils double, one before the other, declining obliquely from the orbit to the rostrum, the anterior oval, and by much the largest. The opercula without scales; striate, rough; the rounded edge of the anterior lamina, armed with a robust, curve, channeled spine, one inch and three lines long, furnished with a sheath, and pointing backwards and upwards. The branchial membrane visible; the aperture large, lateral and gular.

The *trunk*. The back very gradually arched to the last of the dorsal spines, when it rounds off, descending almost perpendicularly to the tail. The breast and belly are less arched, but the posterior part rounded and bulging out, ascends in like manner as the back descends. The lateral line beginning at a remarkable mark, high on the shoulders, bends in a low arch to the middle of the tail. The anus centrical.

The *fins*. The dorsal occupies the back intirely, from the shoulder to the tail. It consists of thirteen assurgent, strong, not long, spines, and twenty-two soft rays, the four first of which uniting, form a setaceous tail, eight inches in length: the rest of the fin is hardly an inch in breadth, declining very little to the end; the pectoral rather short, acuminate above; the ventral long, falcate, ending in a setaceous tail of three inches; the anal commencing a little behind the anus, and following the shape of the body, ascends arch-form opposite to the dorsal; the caudal fin entire, and like the dorsal and anal, remains expanded after death. The fins, as usual, are squamous.

The *colour* of the head a reddish orange; of the body, a dull golden, with several curve, azure fillets, which are continued on the dorsal fin: two of them, from the front, cross the face and opercula; on each shoulder, there is a remarkable square spot, orange in the middle, the sides azure; the dorsal and anal fins are darker

than the head, with fillets of darker azure than those on the body; the pectoral yellow; the ventral fins striped sky blue, yellow and brown. There are three transverse fillets of light blue on the tail, but the fin is perfectly white with only an elegant narrow edging at the end.

In a smaller subject the head was cinerious; the yellow colour of the body darker, and the azure fillets brighter; but their shape, nor that of the mark on the shoulder did not vary.

| | Feet. | Inches. | Lines. |
|---|---|---|---|
| *Length*, from the rostrum to the caudal fin | 1 | 0 | 0 |
| of the caudal fin | 0 | 1 | 8 |
| Greatest breadth of the body | 0 | 8 | 0 |
| Breadth of caudal fin at the base | 0 | 1 | 8 |
| at the end | 0 | 3 | 0 |

## REMARKS.

The present subject bears a strong resemblance to the Chætodon Annularis,* but differs principally in two circumstances: the one, the setaceous elongation of the dorsal fin, resembling that of the Chætodon Setifer;† the other, (less material) in the remarkable ring on the shoulder being rather square than of a circular figure.

The genus Chætodon may be reckoned of all others the most numerous. It is supposed to comprehend above eighty species; though all of these have not been exactly described, and drawings of many are still wanting. To twenty-three species known to Linnæus, forty have been added in Gmelin's edition of the Systema Naturæ; and among other new ones since collected by Bloch, are three or four beautiful species received from Tranquebar.‡ The greater part now known to naturalists have been furnished by the East Indies; but the American seas, besides possessing in common many of those, has a peculiar claim to others.

* Linn. Ed. Gmel. p. 1263.

† Bloch, Pl. 426.

‡ Chæt. Setifer, Pl. 426.
———Falcula, ib.
———Maculatus, Pl. 428.

KARWA.

# SPARUS.

GENERIC CHARACTER.

*Dentes incisores vel laniarii robusti; molares obtusiusculi, conferti. Labia duplicata. Membrana branchialis radiis quinque. Corpus compressum. Linea lateralis postice curvata. Pinnæ pectorales rotundatæ.*

The canine, or cutting teeth, strong, the grinders bluntish, and thick set. The lips double. The branchial membrane has five rays. The opercula squamous. The body compressed; the lateral line curved behind. The pectoral fins rounded.*

## No. LXXXIX.

SPARUS *cauda bilobata; spinis dorsalibus decem; corpore cinereo.*

The SPARUS with a tail unequally bifid; ten dorsal spines; the body of a whitish gray colour.

Called by the Natives KARWA.

*B.* vi. *D.* $\frac{10}{20}$. *P.* 13. *V.* $\frac{1}{6}$. *A.* $\frac{3}{12}$. *C.* 20.

THE *body* oblong-ovate, compressed, smooth; scales large, roundish, ciliate, imbricate, tenacious.

The *head* very large, compressed, declivous, face smooth without scales; the front convex, steep; the mouth low, terminal, transverse, wide; lips thickish. Jaws extractile, upper somewhat longer than the under. Teeth dissimilar, canine and grinders, and behind the latter, both above and below are several close rows of very small teeth. The tongue short, round, obtuse, smooth, bridled. The palate wide, smooth. Eyes middle, large, flat. Nostrils double, equidistant from the orbit and point of the rostrum; the posterior oval, the anterior round: both small. The opercula consist of two laminæ and an appearance of a third; the anterior angular, the posterior rounded and squamous. The branchial membrane exposed; the aperture large, arched.

The *trunk*. The back arched, carinate, the breast and abdomen flat; the sides and tail compressed. Branchiæ tuberculate. Lateral line supreme, bending at first very gently, runs afterwards straight to the middle of the caudal fin. The anus remote, or nearer the tail than the head.

The *fins*. The dorsal consists of ten spinous rays, arched, reclining in a groove, and of ten ramous, assurgent rays; the pectoral low, acuminate above, long; the ventral also in a groove, long, setaceous; the anal assurgent; the caudal bilobate, the upper lobe longest.

*Colour* a bluish gray, growing lighter towards the belly; the breast and belly white: some faint bluish streaks on the head. The dorsal, pectoral, and caudal fins have a yellowish cast; the ventral and anal a darkish blue: the inside of the mouth is of a yellowish red.

*Length* of the subject described one foot, including the tail.

REMARKS.

In younger and smaller subjects, the edge of the dorsal and anal fins is of a deep orange; while the caudal and other fins are of a darkish red.

* The generic character of the pectoral fins, in the Sparus, according to Gouan, is *acuminatæ*, which agrees better to all the species following, than the *rotundatæ* of Linnæus.

## No. XC.

SPARUS *cauda ferè integra; corpore et pinnis rubris.*

The SPARUS with a tail nearly entire; the body and fins red.

*Sparus Erythrinus Linn. S. N. p.* 469?

Called by the Natives JAHNGARAH.

*B.* vii. *D.* $\frac{11}{25}$. *P.* 17. *V.* $\frac{1}{6}$. *A.* $\frac{3}{12}$. *C.* 18.

THE *body* oblong-ovate, compressed, red; scales large, roundish, a little ciliate at the edge, the base striate, imbricate, firm, extended on the fins.

The *head* large, compressed, declivous, front and face smooth, without scales, fleshy. Mouth low, nearly horizontal, large; lips thick, soft. Jaws of equal length, extractile. Teeth numerous, partly small, straight, partly large, recurve. Tongue large, sub-ovate, smooth, moveable. The palate rough. Eyes high, remote from the rostrum, large, orbicular, prominent. Nostrils double, near the rostrum, one oval, large, the anterior one oblong, divided.

The opercula squamous, the posterior lamina acuminate. The branchial membrane exposed; the aperture large, lateral and gular.

The *trunk*. The back carinate, and rising in an arch from the vertex to the middle of the dorsal fin, slopes gradually to the tail; the sides compressed, convex; the breast and belly rounded, not prominent; the tail broad and compressed. The lateral line high, arched, at first runs parallel to the back, then straight along the middle of the tail to the fin. The anus nearer the tail than the head.

The *fins*. The spinous rays of the dorsal arched, the others assurgent to the ninth, and then gradually shorten; the pectoral very long, acuminate in the middle, setaceous; the ventral, in like manner, acuminate, and setaceous; the anal ascendent, but rounded at the end, and all the rays, as in the dorsal, exceeding the membrane. The anal broad, and sub-lunate.

The *colour* of the whole fish, the fins included, a beautiful red, but the head and back, deepest; and beneath the lateral line, part of the white scales appearing gives it more of a pink colour.

*Length*, one foot eight inches.

### REMARKS.

About the beginning of March, this fish is caught in abundance with hook and line, from katamarans on the outside of the surf. They are strung as caught, and dragged astern of the katamaran to the beach, where they are sold at 2 dubs a piece.* It is an excellent fish for the table. They are caught also in nets.

* A halfpenny.

IAHN GARAH.

CHITCHILLEE.

CALAMARA.

## No. XCI.

SPARUS *cauda bilobata; spinis pinnæ dorsalis undecem; corpore lato, sub ovale, lineis longitudinalibus, parallelis, aureis argenteisque, alternatim.*

The SPARUS with a divided tail of two unequal lobes, eleven spines in the dorsal fin, a broad sub-oval body, with longitudinal, parallel lines alternately gold and silver.

Called by the Natives CHITCHILLEE.

*B.* vi. *D.* $\frac{11}{24}$. *P.* 15. *V.* $\frac{1}{6}$. *A.* $\frac{3}{14}$. *C.* 18.

THE breast and belly being here more convex than usual in this genus, gives the fish more of an oval form. The head is short, almost truncate; but the mouth, teeth, tongue, palate, eyes, nostrils, and scaly, acuminate opercula, are nearly as in the fish last described. The branchial membrane consists of six rays, half concealed.

The dorsal spines form an arch; the soft rays of the dorsal and anal fins nearly of equal length, and the ends fibrous; the pectoral and ventral sharp pointed; the caudal divided; the upper lobe a little longer than the lower.

The *colour*, varies in subjects of different size; in the one now described, the front was of a dark, shining green, the rest of the head silvery. The back and sides were striped longitudinally with narrow fillets gold and silver alternately, curve above the lateral line but straight below it. The dorsal fin ash colour with a black border, the ossicles silvery: the other fins pale yellow with orange margins.

In smaller subjects the fillets instead of gold were red above the line, and of a dusky yellow below it, in which case, there was a mixture of red on the fin.

The *length*, thirteen inches, and seldom exceeds sixteen.

The fish is not in much esteem for the table.

## No. XCII.

SPARUS *cauda sub-bifida; corpore vario, cinereo et nigro; spina ventralis, et secunda pinnæ analis robustissima.*

The SPARUS with a somewhat bifid tail; the body variegated black and gray, the ventral spine, and the second anal spine, remarkably large and strong.

Called by the Natives CALAMARA.

*B.* v. *D.* $\frac{11}{23}$. *P.* 15. *V.* $\frac{1}{6}$. *A.* $\frac{3}{13}$. *C.* 18.

THIS species agrees in the essential generic characters. The head is sharper, the mouth higher, and the hinder part of the body fuller and rounder, than in the last species.

The spinous rays of the fins, particularly the ventral, and second anal, remarkably large. The pectoral fin long, broad and pointed. The ventral situated between two long, sharp, scale-like laminæ, are likewise large.

The *colour* of the head a dusky purple; of all the rest, including the fins, gray, but the scales on the trunk, having black margins, give the variegated appearance black and gray; the belly has a faint reddish cast.

The subject described measured only eleven inches: they are sometimes brought of a size considerably larger.

REMARKS.

This species is in esteem, and often appears at the European tables; it is reckoned one of the rock fish, having the peculiar flavour belonging to that tribe.

## No. XCIII.

SPARUS *cauda fere integra; corpore rufo-albescente, operculo sub-serrato.*

The SPARUS with a tail very slightly lunate; the body a reddish white; the operculum slightly serrated.

Called by the Natives CHIRTAH.

*B.* vii. *D.* $\frac{11}{25}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{12}$. *C.* 16.

THE *body* ovate; the scales remarkably small.

The *head* large, compressed; the front smooth, opercula squamous. The mouth, lips, jaws, teeth, tongue, eyes and nostrils, as usual. The palate rough. The anterior lamina of the opercula, a little serrated, the posterior acuminate.

The back, and the lateral line arched, the belly rather prominent; the tail broad; the anus remote.

The *fins*. The dorsal interrupted, the spinous rays slender, compared with the last fish, and the posterior part blunt-pointed; the pectoral and ventral fins, long, narrow, acuminate: the point of the latter setaceous. The anal assurgent, rounded; the caudal fin slightly lunate.

The *colour* of the head a reddish shining copper, that of the back is nearly the same intermixed with a dull white. The throat and belly whitish, with a yellowish red cast. The dorsal, anal, and caudal fins of a dull red: the pectoral and ventral pale red: the latter tipped with black.

*Length* of the subject thirteen inches.

## No. XCIV.

SPARUS *cauda integra; spinis dorsalibus decem; operculo sub-serrato; dorso et pinnis, purpurascentibus.*

The SPARUS with an undivided tail; ten dorsal spines; the operculum slightly serrated; the back and the fins of a purplish colour.

Called by the Natives RANGOO.

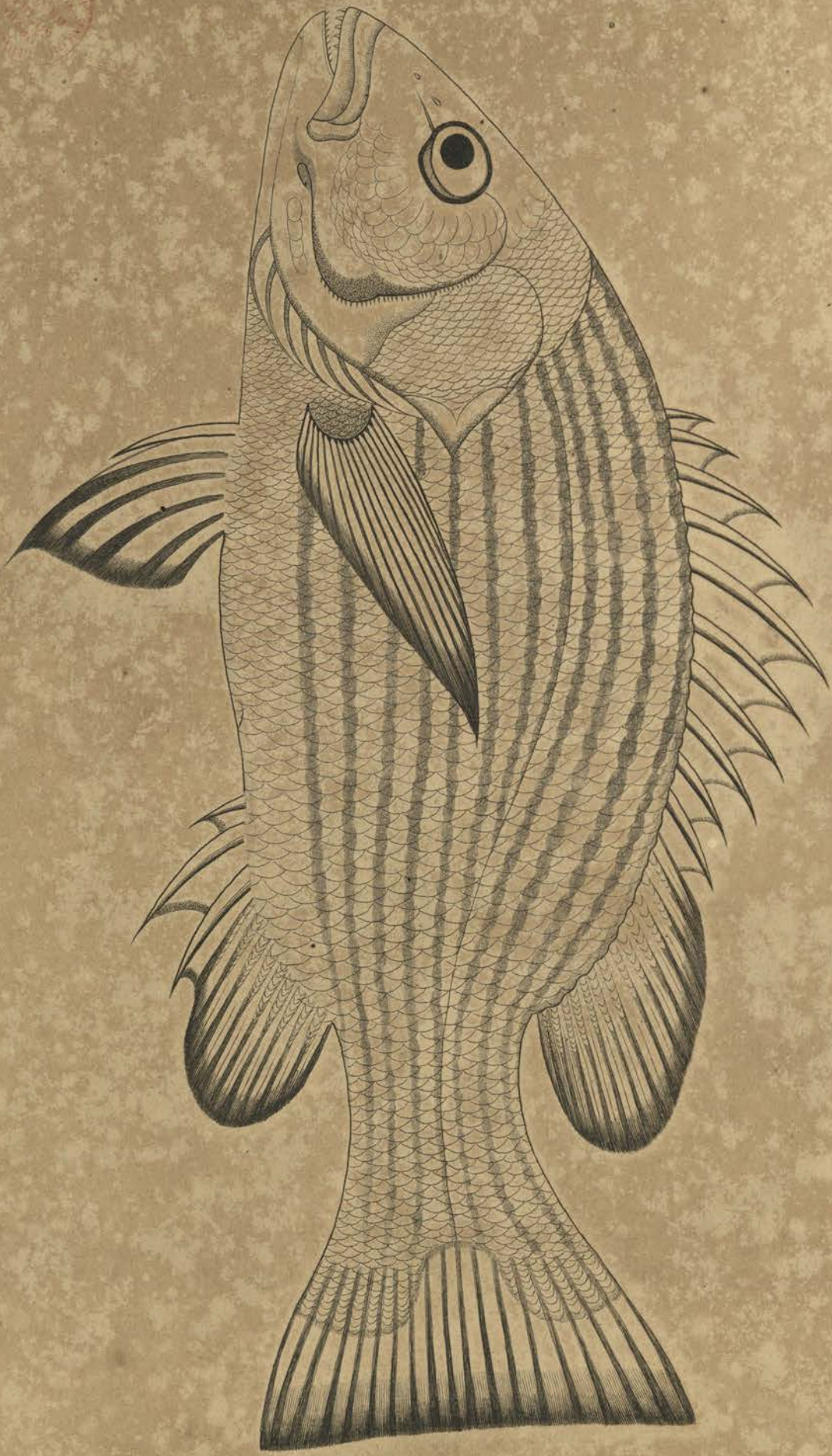
*B.* vii. *D.* $\frac{10}{23}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{11}$. *C.* 17.

THE *body* of this species more oblong than the last; the scales larger and extended further on the fins.

The *head* declivous, and the mouth low, as usual in the genus, nor is there any variation as to the jaws, lips, teeth, eyes, and nostrils; but the tongue here is rough, and there are a few teeth in the palate. The opercula and membrane, as in the last described, the belly is more straight and flat, and the tail broader: the lateral line less arched.

CHIRTAH.

RANGOO.



YAPILLL.

KALLEE MAEE.

The *fins*. The form and disposition of the fins are the same as in the last, but the soft rays are more ramous, and the dorsal spines here recline in a groove; the pectoral is very slightly falcate; and the ventral does not terminate in a setaceous point.

The *colour* of the face a very dark purple, the opercula lighter purple, the throat reddish. The back, above the line, of the same colour as the face, but beneath it, the purple brightens a little; the breast and belly reddish intermixed with white. The pectoral fin is orange, all the others are purple, of a shade lighter than the back; the edge of the caudal a reddish brown.

The *length* of the subject described thirteen inches, but they are brought double that size.

In quality it is not much esteemed by the Europeans.

## No. XCV.

SPARUS *cauda truncata; spinis dorsalibus decem; operculo anteriore serrato; pinnis flavescentibus.*

The SPARUS with a truncate tail; ten dorsal spines; the anterior operculum serrated; the fins yellow.

Called by the Natives YAPILLI.

*B.* vii. *D.* $\frac{10}{25}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{12}$. *C.* 18.

THIS species has a more serrated operculum, and the fins are more squamous than usual.

The *colour* of the face purplish; the back a dark gray, which grows gradually lighter on the sides below the lateral line; the sides streaked longitudinally with darkish fillets; the belly a yellowish white. All the fins are yellowish, but the edges of the dorsal, anal, and caudal, approach to an orange colour.

The *length* from the nose to the end of the caudal fin, thirteen inches.

## No. XCVI.

SPARUS *cauda integra; spinæ anales dorsalibus robustiores; corpore ovale, punctis lineisque cæruliis vario; macula rotunda ad lineam lateralem.*

The SPARUS with an undivided tail; the anal spines stronger than the dorsal; the oval body variegated with light blue dots and short lines; a round spot on the lateral line.

Called by the Natives KALLEE MAEE.

*B.* vii. *D.* $\frac{10}{26}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{12}$. *C.* 18.

THIS species agreeing in most respects, with the others already described, is sufficiently distinguished by its form and colour.

The *body* approaches nearer to oval than the others, and the crown is flatter; the anterior lamina of the opercula serrated, the second has a small dent in the edge, for the reception of a little blunt process on the edge of the posterior lamina. The tongue is smooth, bridled; the fore part of the palate rough.

The *fins*. The spines of the anal fin thicker than those of the dorsal; the pectoral fins acuminate above; the caudal entire.

The *colour*. The front adorned with several rows of small azure dots, and the cheeks and opercula with curve and straight lines of the same colour, some dots being interspersed: all on a changeable gold ground. The scales are of a dark ash-colour, with azure edges, giving an elegant appearance to the whole trunk; and on the lateral line is an orbicular mark, blue, brown, and white. The dorsal fin and upper half of the caudal a yellowish brown; the pectoral gray, the other fins blue.

The *length* of the subject described, six inches; but I have seen others nearly two feet long; and in such the colours were less vivid.

## No. XCVII.

SPARUS *cauda sub-bilobata; spinis dorsalibus decem; operculo anteriore serrato; corpore vittis obscuris; macula rotunda nigrescente supra lineam lateralem.*

The SPARUS with a tail slightly bilobed; the anterior operculum pectinate; obscure longitudinal bands on the body, and a blackish, round spot above the lateral line.

Called by the Natives DOONDIAWAH.

*B.* vi. *D.* $\frac{10}{25}$. *P.* 15. *V.* $\frac{1}{6}$. *A.* $\frac{3}{12}$. *C.* 20.

THE *body* ovate, the head rather more pointed than usual in this genus; the anterior lamina of the opercula serrated.

The *colour* of the head purplish, and faint red, but the opercula towards the branchiæ golden. The back has a dull greenish cast, with several curve dark fillets, running from the opercula to the tail; but below the line, the colour grows gradually lighter on the sides, changing on the belly to a pale yellow; the breast white with a yellow cast. The sides are also striped with dusky, straight fillets, and between the dorsal fin and lateral line there is an orbicular, blackish, spot. The fins are of a reddish yellow, the edge of the dorsal and caudal membranes orange.

*Length* of the subject, ten inches,

## No. XCVIII.

SPARUS *cauda sub-lunata; spinis dorsalibus decem; corpore oblongo ovale, lineis longitudinalibus et obliquis, fulvis et flavis; macula nigra ad lineam lateralem.*

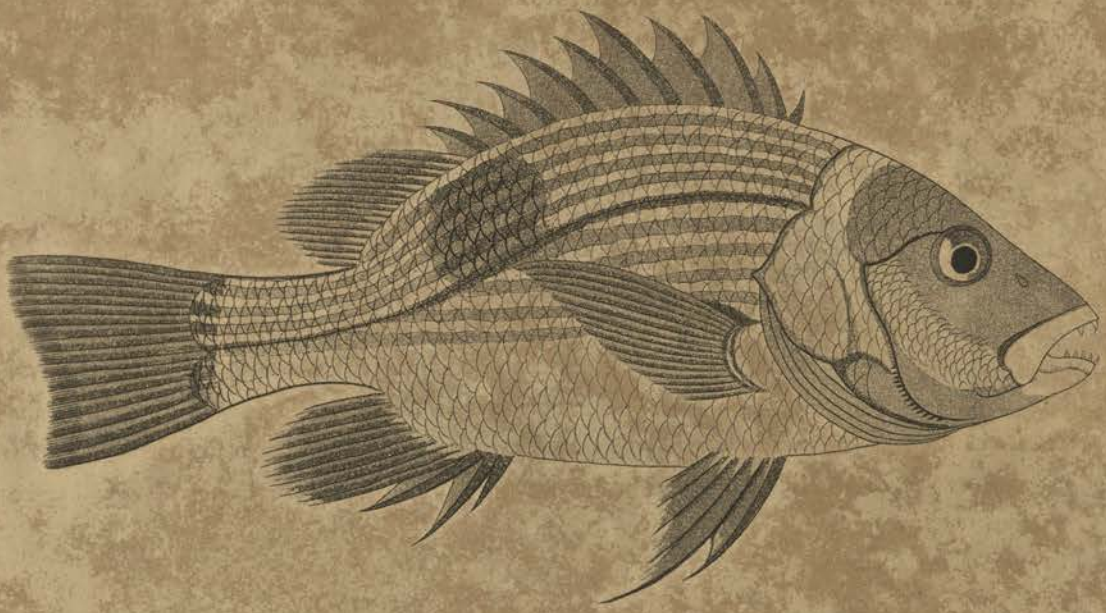
The SPARUS with a tail somewhat lunate; ten dorsal spines; an oblong-oval body, with longitudinal and oblique lines of dusky and bright yellow; and on the lateral line, a black spot.

Called by the Natives ANTIKA DOONDIAWAH.

*B.* vii. *D.* $\frac{10}{24}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{9}$. *C.* 20.

THE form of the head and position of the eyes nearly the same as in the last, the operculum also serrate; but the body is more of an oblong shape and the lateral line less arched.

The *colour*. The head red, shining as if varnished; the back of a darker red, which below the line brightens



DOONDIAWAH

ANTIKA DOONDIAWAH.

BOTLAWOO CHAMPAH.

nearly to pink; the belly a yellowish white; the breast white. Above the line, three or four darkish yellow lines run from the ridge of the back to the hind head; and below the line, two fillets of the same colour run straight to the caudal fin, while the other two of lighter yellow, and a little curve, run from the face to the anal fin: besides these, there is a remarkable oblong, black spot touching the lateral line. The dorsal and caudal fins are of a dull purple, the latter edged red; the other fins are yellow. These colours vary in subjects of different ages, but the spot on the lateral line is constant.

The *length*, eleven inches.

## No. XCIX.

SPARUS *cauda bifida; spinis dorsalibus decem; corpore fasciis duabus latissimis, sanguineis, insigniter picto.*

The SPARUS with a bifid tail, and ten dorsal spines; two remarkable broad, blood-colour bands on the body.

Called by the Natives BOTLAWOO CHAMPAH.

*B.* vi. *D.* $\frac{11}{28}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{14}$. *C.* 17.

THIS species, which is richly coloured, differs in the form of its body from those last described. The back is more arched; the breast and belly straighter; the scales smaller than usual in this genus, and the hinder part of the dorsal, as well as the anal fin, remarkably acuminate. The tail slightly bifid.

The eyes oval; nostrils small, distant from each other; the tongue long, lanceolate, smooth, free. Teeth regular, not close; some teeth in the palate. The first lamina of the opercula slightly serrated. The lateral line conspicuous but not carinate.

The front and rostrum are of a deep blood colour, the rest of the face and lips pink; two very broad bands of a still deeper red than the front, cross the trunk; one from the points of the three first dorsal spines to the ventral fin, the other from the margin of the hinder dorsal, curves to the under margin of the caudal, on which it is continued: the interstices between them a light gray, variegated with transverse lines of white dots. The throat white; the belly pale pink. The pectoral fin is pink; the dorsal, ventral, and anal, with the points of the caudal lobes, look as if dipped in blood.

*Length*, eleven inches; breadth three and a half.

## No. C.

SPARUS *cauda biloba; spinis dorsalibus decem; corpore oblongo-ovato, vario; linea lateralis descendens.*

The SPARUS with a tail unequally divided; ten spines in the dorsal fin; an oblong body variously coloured; the lateral line descending.

Called by the Natives SILAOO.

*B.* vii. *D.* $\frac{10}{24}$. *P.* 16. *V.* $\frac{1}{6}$. *A.* $\frac{3}{12}$. *C.* 18.

THE *body* oblong-ovate; the back not much arched, the sides compressed, the belly convex.

The *head* smooth, but less declivous than in most of the other species. Mouth large; fore teeth in the upper jaw long; tongue large, ovate, free, and like the palate, rough in the middle. The anterior lamina of the opercula slightly serrated. The lateral line very gently arched above the pectoral fin.

The *fins*. The dorsal and anal fins not broad, the posterior edge of both rounded; the pectoral short, acuminate; the ventral also acuminate; the caudal unequally divided, the lower lobe shortest.

The *colour*. The cheeks spotted yellow, on a light ground; the back cinerious, the sides, belly and breast reddish; the dorsal and caudal fin purplish; the pectoral has a yellowish cast; the ventral and anal a yellowish red. Sometimes the caudal fin is of a darker red and each lobe tipped yellow.

*Length* of the subject fifteen inches.

END OF VOLUME I.

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SILAGO.

# SYSTEMATICAL INDEX

## TO VOLUME I.

## AMPHIBIA NANTES.


| No. | *Names at Vizagapatam.* | Page | No. | *Names at Madras.* |
|---|---|---|---|---|
| | **RAJA.** | | | |
| 1 | Temeree - - | 1 | 1 | |
| 2 | Nalla Temeree - | 2 | 2 | |
| 3 | Wolga Tenkee - | ib. | 3 | Atovalantreka. |
| 4 | Isaccurah Tenkee - | 3 | 4 | Chemmentreka. |
| 5 | Tenkee Shindraki | ib. | 5 | Shemberaca. |
| 6 | Tenkee Kunsul - | 4 | 6 | |
| 7 | Mookara Tenkee | ib. | 7 | Panjal Terki. |
| 8 | Eel Tenkee - - | 5 | 8 | |
| 9 | Ereegoodoo Tenkee | ib. | 9 | |
| 10 | Walawah Tenkee - | 6 | 10 | |
| 11 | Suttiwarah - - | 7 | 11 | Kalwata. |
| | **SQUALUS.** | | | |
| 12 | Coma Sorra - - | 8 | 12 | |
| 13 | Yahla - - - | ib. | 13 | |
| 14 | Pala Sorra - | 9 | 14 | Palsorra. |
| 15 | Sorra Kowah - | ib. | 15 | Sunjura. |
| 16 | Bokee Sorra - - | 10 | 16 | Koram Sorra. |
| 17 | Ra Sorra - - | ib. | 17 | |
| 18 | Poolee Makum - | 11 | 18 | |
| | **LOPHIUS.** | | | |
| 19 | Kappa Mura Moia | 12 | 19 | Timili Puche. |
| | **BALISTES.** | | | |
| 20 | Rahtee Yellakah - | 13 | 20 | Carpu Mulai. |
| 21 | Bowree - - | 14 | 21 | Mullura. |
| 22 | Lama Yellakah - | 15 | 22 | |
| 23 | Somdrum Yellakah | 16 | 23 | |
| | **TETRAODON.** | | | |
| 24 | Kappa - - - | 17 | 24 | |
| 25 | Kappa - - - | 18 | 25 | Paulushe. |
| 26 | Kappa - - - | 18 | 26 | Palusha. |
| 27 | Bondaroo Kappa - | 19 | 27 | |
| 28 | Calamarah Kappa | ib. | 28 | |
| 29 | Kappa Koorawah | 20 | 29 | |
| | **SYNGNATHUS.** | | | |
| 30 | Goorapoo Subbookoo | 21 | 30 | Vatupuche. |


## PISCES APODES.


| No. | *Names at Vizagapatam.* | Page | No. | *Names at Madras.* |
|---|---|---|---|---|
| | **MURÆNA.** | | | |
| 31 | Chowloo Pamoo - | 22 | 31 | |
| 32 | Calamaia Paum - | ib. | 32 | |
| 33 | Malagu Paum - | 23 | 33 | |
| 34 | Malagu Paum - | 24 | 34 | |
| 35 | Dondoo Paum - | 25 | 35 | |
| 36 | Taloo Paum - - | ib. | 36 | |
| 37 | Manti Bukaro Paumu | 26 | 37 | Ella Pamboo. |
| | **OPHIDIUM.** | | | |
| 38 | Tala Bon - - | 27 | 38 | Kadawal Woolva. |
| 39 | Tonka Talawaree - | 28 | 39 | |
| 40 | | | 40 | |
| | **TRICHIURUS.** | | | |
| 41 | Sawala - - - | 30 | 41 | Sauvala. |
| | **STROMATEUS.** | | | |
| 42 | Tella Sandawah - | 31 | 42 | Valeval. |
| 43 | Nala Sandawah - | 32 | 43 | |
| 44 | Atoo Koia - - | 33 | 44 | |
| 45 | Sudi Sandawah - | 34 | 45 | |


## PISCES JUGULARES.


| | | | | |
|---|---|---|---|---|
| | **CALLIONYMUS.** | | | |
| 46 | Irrwa - - - | 36 | 46 | |
| 47 | Irrwa - - | 37 | 47 | Tonne Wolva. |
| 48 | Somdrum Kara Moodee | ib | 48 | Kakushee. |


## PISCES THORACICI.


| | | | | |
|---|---|---|---|---|
| | **ECHENEIS.** | | | |
| 49 | Ala Mottah - - | 39 | 49 | Kerrywalla. |
| | **GOBIUS.** | | | |
| 50 | Kora Motta - | 40 | 50 | |
| 51 | Koku - - - | 41 | 51 | Maluchile. |

| *Names at Vizagapatam.* | | | Page | *Names at Madras.* |
|---|---|---|---|---|
| **GOBIUS** *continued.* | | | | |
| No. | | | Page | No. |
| 52 | Nuna Motta | - - | ib. | 52 Natchule. |
| 53 | Bullee Kokah | - | 42 | 53 Poonkolil. |
| 54 | Nettee Kunla Mottah | | ib. | 54 Korava. |
| 55 | Peel Mottah | - | 43 | 55 |
| **SCORPÆNA.** | | | | |
| 56 | Mooroo Bontoo | - | 44 | 56 |
| **ZEUS.** | | | | |
| 57 | Gurrah Parah | - | 45 | 57 Sitnoli Para. |
| 58 | Chewoola Parah | - | 46 | 58 Yargumobicha Para. |
| 59 | Kauki Sandawa | - | 47 | 59 Mowan. |
| 60 | Ambata Kuttee | - | ib. | 60 Ambata Kathey |
| 61 | Goomoorah Karah | | 48 | 61 Kodkera. |
| 62 | Totta Karah | - - | 49 | 62 Kalikara. |
| 63 | Komah Karah | - | 50 | 63 |
| 64 | Bindoo Karah | - | 51 | 64 |
| 65 | Dacer Karah | - - | 51 | 65 |
| 66 | Karah | - - | ib. | 66 |
| 67 | Wodawahah | - - | 52 | 67 |
| 68 | Woodan | - - | 53 | 68 |
| **PLEURONECTES.** | | | | |
| 69 | Adalah | - - | 54 | 69 Naraloo. |
| 70 | Jerree Potoo. | A - | 55 | 70 Nakerloo. |
| 71 | Jerree Potoo. | B - | 56 | 71 |
| 72 | Jerree Potoo. | C - | ib. | 72 Pelerloo. |
| 73 | Jerree Potoo. | D - | 57 | 73 Nelarloo. |
| 74 | Jerree Potoo. | E. - | 58 | 74 Nelarloo. |

| *Names at Vizagapatam.* | | | Page | *Names at Madras.* |
|---|---|---|---|---|
| **PLEURONECTES** *continued.* | | | | |
| No. | | | Page | No. |
| 75 | Nooree Nalaka. | A | ib. | 75 |
| 76 | Nooree Nalaka. | B | 59 | 76 Patna Sutan. |
| 77 | Nooree Nalaka. | C | 60 | 77 Putnu Sutan. |
| **CHÆTODON.** | | | | |
| 78 | Pool Chitsilloo | - | 61 | 78 Calamin. |
| 79 | Latte | - - - | 62 | 79 Kellmin. |
| 80 | Tarla. | A - | 63 | 80 Tarla. |
| 81 | Tarla. | B - - | 64 | 81 Tarla. |
| 82 | Mata | - - - | ib. | 82 Kolemin. |
| 83 | Painah | - - | 56 | 83 |
| 84 | Moota | - - - | 66 | 84 |
| 85 | Calamoia Pota | - | 67 | 85 |
| 86 | Rahti Pota | - - | ib. | 86 |
| 87 | Kahi Sandawa | - | 68 | 87 |
| 88 | Sahni Tchapa | - | 69 | 88 |
| **SPARUS.** | | | | |
| 89 | Karwa | - - - | 71 | 89 |
| 90 | Jahngarah | - | 72 | 90 |
| 91 | Chitchillee | - - | 73 | 91 |
| 92 | Calamara | - - | ib. | 92 Mattywan. |
| 93 | Chirtah | - - | 74 | 93 |
| 94 | Rangoo | - - | ib. | 94 Tokari. |
| 95 | Yapilli | - - - | 75 | 95 Matawa. |
| 96 | Kallee Maee | - | 76 | 96 Matiwan. |
| 97 | Doondiawah | - - | ib. | 97 Vakada. |
| 98 | Antika Doondiawah | | ib. | 98 |
| 99 | Botlawoo Champah | | 77 | 99 |
| 100 | Silaoo | - - - | 78 | 100 Sengarava. |

# ALPHABETICAL INDEX

## TO VOLUME I.


| *Names at Vizagapatam.* | Page | *Names at Madras.* | No. |
|---|---|---|---|
| **A.** | | | |
| Adalah | 54 | | |
| Ala Mottah | 39 | Ambata Kathey | 60 |
| Ambata Kuttee | 47 | Atovalantreka | 3 |
| Antica Doondiawah | 76 | | |
| Atoo Koia | ib. | | |
| **B.** | | | |
| Bindoo Karah | 50 | | |
| Bokee Sorra | 10 | | |
| Bondaroo Kappa | 19 | | |
| Botlawoo Champah | 77 | | |
| Bullee Kokah | 42 | | |
| Bowree, or Abatoo | 14 | | |
| **C.** | | | |
| Calamaia Paum | 22 | Calamin | 78 |
| Calamara | 73 | Chementreka | 4 |
| Calamara | ib. | Carpu Mulai | 20 |
| Calamarah Kappa | 19 | | |
| Calamoia Pota | 67 | | |
| Chewoola Parah | 46 | | |
| Chirtah | 74 | | |
| Chitchillee | 73 | | |
| Chowloo Pamoo, or Malgumaru | 22 | | |
| **D.** | | | |
| Dacer Karah | 51 | | |
| Dondoo Paum | 25 | | |
| Doondiawah | 76 | | |
| **E.** | | | |
| Eel Tenkee | 5 | Ella Pamboo | 37 |
| Ereegoodoo Tenkee | 5 | | |
| **G.** | | | |
| Goomorah Karah | 48 | | |
| Gurrah Parah | 45 | | |
| Goorahpoo Subbookoo | 21 | | |
| **I.** | | | |
| Irrwa | 36 | | |
| Irrwa | 37 | | |
| Isacurrah Tenkee | 3 | | |

| *Names at Vizagapatam.* | Page | *Names at Madras.* | |
|---|---|---|---|
| **J.** | | | |
| Jahngarah | 72 | | |
| Jerree Potoo. A | 55 | | |
| Jerree Potoo. B | 56 | | |
| Jerree Potoo. C | 56 | | |
| Jerree Potoo. D | 57 | | |
| Jerree Potoo. E | 58 | | |
| **K.** | | | |
| Kahi Sandawa | 68 | Kadal Woolva | 38 |
| Kappa Mura Moia | 12 | Kakachee | 48 |
| Karah | 51 | Kali Kara | 62 |
| Karwa | 71 | Kalwala | 11 |
| Kauki Sandawa | 47 | Kellmin | 79 |
| Koku | 41 | Kerry Walla | 49 |
| Komah Karah | 50 | Kolemin | 82 |
| Koma Sorra | 8 | Kodkara | 61 |
| Korah Motta | 40 | Koram Sorra | 16 |
| Kallee Maee | 76 | Korava | 54 |
| Kappa | 17 | | |
| Kappa | 18 | | |
| Kappa Koorawah | 20 | | |
| **L.** | | | |
| Lama Yellakah | 15 | | |
| Latte | 62 | | |
| **M.** | | | |
| Malagu Paum | 23 | Malacu | 21 |
| Malagu Paum | 24 | Matawa | 95 |
| Manti Bukaro Paumu | 26 | Matiwai | 96 |
| Mata | 64 | Mattywan | 92 |
| Mooroo Bontoo | 44 | Mowan | 59 |
| Moota | 66 | Muluchile | 51 |
| **N.** | | | |
| Nala Sandawah | 32 | Nakarloo | 70 |
| Nalla Temeree | 2 | Naraloo | 79 |
| Nettee Kunla Mottah | 41 | Natchuli | 52 |
| Nooree Nalaka. A | 58 | Nelarloo | 73 |
| Nooree Nalaka. B | 59 | Nelarloo | 74 |
| Nooree Nalaka. C | 60 | | |
| Nuna Motta | 41 | | |

# ALPHABETICAL INDEX.


| *Names at Vizagapatam.* | Page | *Names at Madras.* | No. |
|---|---|---|---|
| **P.** | | | |
| Painah | 65 | Palsorra | 14 |
| Pala Sorra | 9 | Palasha | 26 |
| Peel Mottah | 43 | Panjul Terki | 7 |
| Pool Chitsilloo | 61 | Patna Sutan | 76 |
| Poollee Makum | 11 | Paulaushe | 25 |
| | | Pelerloo | 72 |
| | | Poonkolil | 53 |
| | | Putna Sutan | 77 |
| **R.** | | | |
| Ra Sorra | 10 | | |
| Rahti Pota | 61 | | |
| Rahtee Yellakah | 13 | | |
| Rangoo | 74 | | |
| **S.** | | | |
| Sahni Tchapa | 69 | Sauvala | 41 |
| Sawala | 30 | Sengarava | 100 |
| Silaoo | 78 | Sitnoti Para | 57 |
| Somdrum Kara Mooddee | 37 | Sunjutra | 15 |
| Sorra Kowah | 9 | | |
| Sudi Sandawah | 34 | | |
| Suttiwarah | 7 | | |

| *Names at Vizagapatam.* | Page | *Names at Madras.* | No. |
|---|---|---|---|
| **T.** | | | |
| Tala Bon | 27 | Tarla | 80 |
| Taloo Paum | 25 | Tarla | 81 |
| Tella Sandawa | 31 | Temmila Puche | 19 |
| Temeree | 1 | Tonne Wolva | 47 |
| Tenkee Kunsul | 4 | | |
| Tenkee Shindraki | 3 | | |
| Terla A | 63 | | |
| Terla B | 64 | | |
| Tonkah Talawaree | 28 | | |
| Tottah Karah | 49 | | |
| **W.** | | | |
| Walawah Tenkee | 6 | | |
| Wodawahah | 52 | | |
| Woodan | 53 | | |
| Wolga Tenkee | 2 | | |
| **V.** | | | |
| | | Vakad | 97 |
| | | Valeval | 45 |
| | | Vatupuche | 30 |
| **Y.** | | | |
| Yahla | 8 | Yargumobicha Para | 58 |
| Yapilli | 75 | | |


END OF VOL. I.


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